PART 1 OF 2 PARTS
SEPTEMBER 30, 1961

Chemical Week

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Bullish prospects for big-volume metals buoy '62 chemical sales outlook . . p. 21

Northern Ireland draws a second look from U.S. chemical investors . . . . . p. 26

Employee retraining — CPI proves that industry can do the job . . . . . p. 43

Butyl tires roll up big sales, bolster butyl market outlook . . . . . p. 97

BRINGING 'EM BACK ALIVE PAYS OFF . . . . . p. 59

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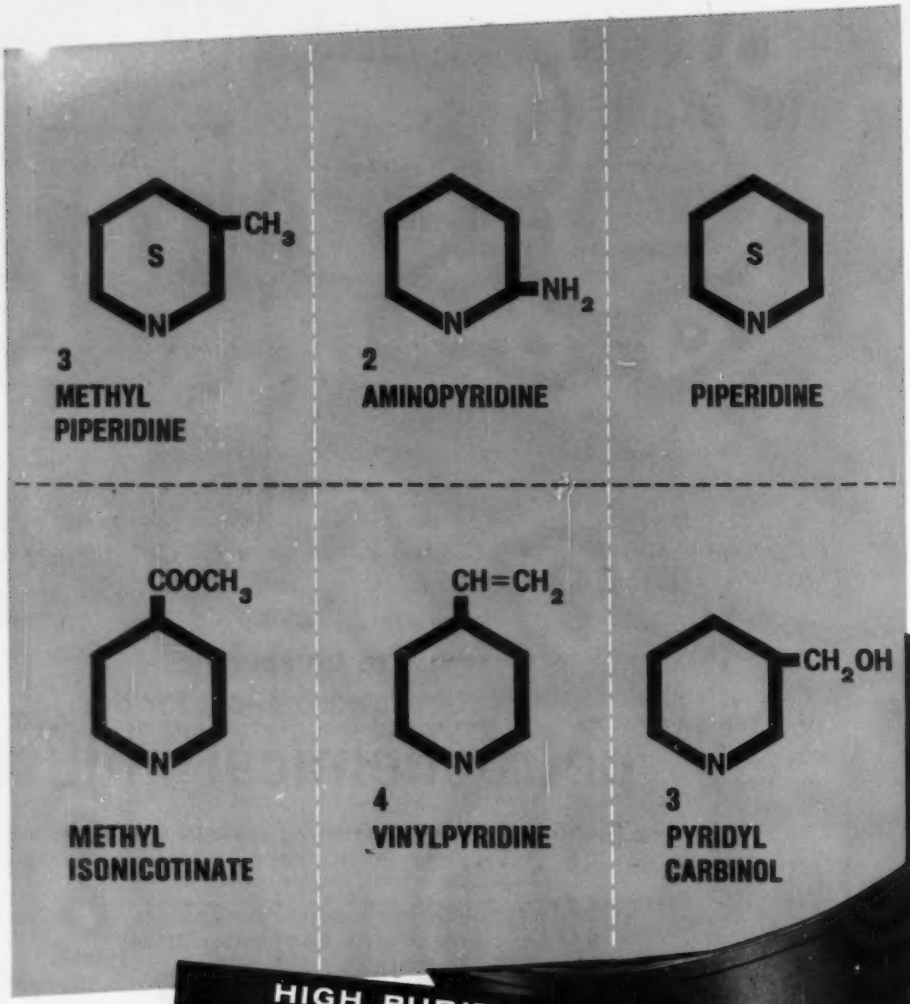

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ON THE COVER: Next stop for the fallen rhinoceros may well be a zoo. The animal was brought down—alive—by an anesthetic dart gun devised by Palmer Chemical (p. 59).

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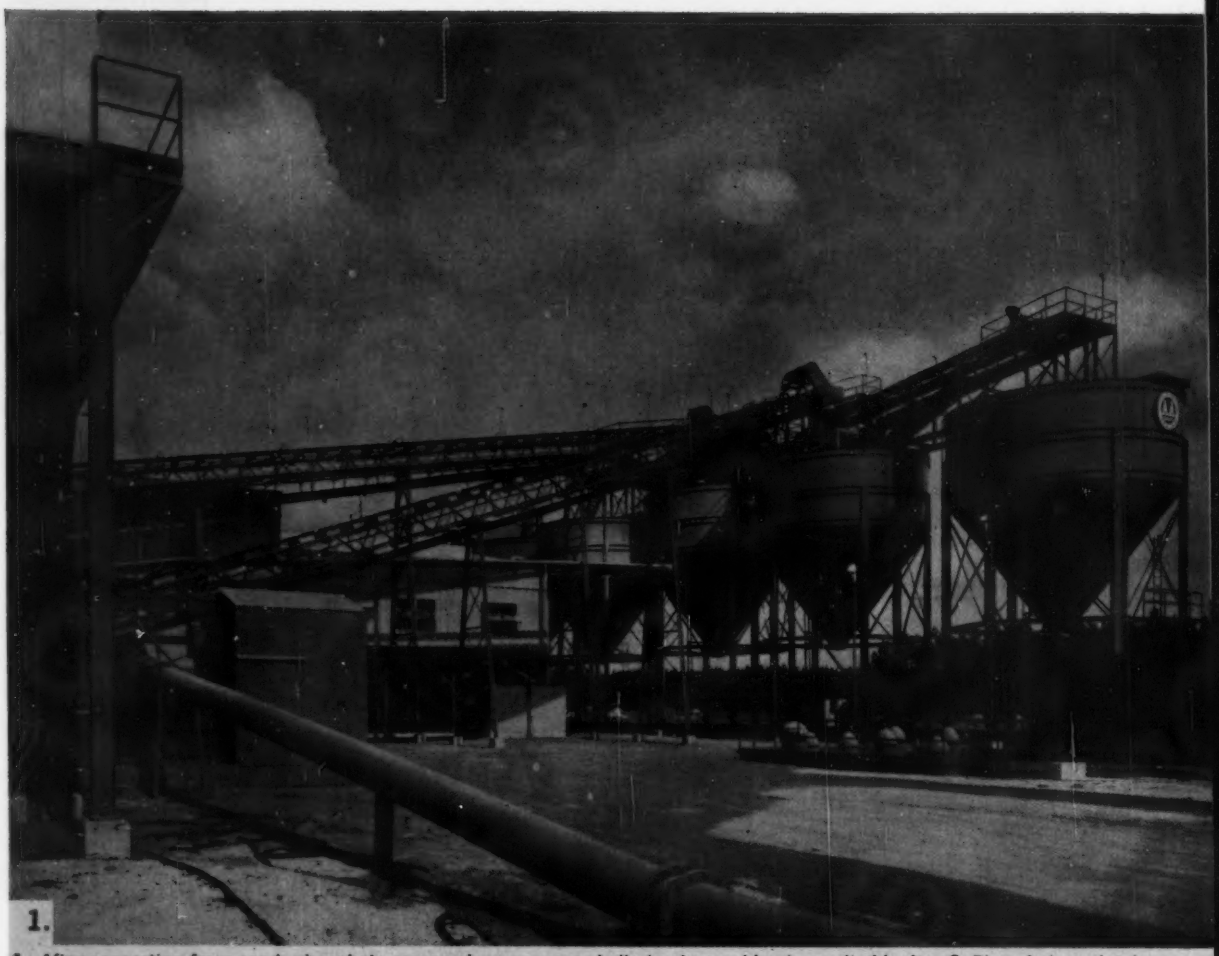

1. After separation from sand, phosphate moves along conveyor belts to storage bins to await shipping. 2. Phosphate maintains a backward flow while remaining sand is held to the center of these four parallel 60" belts, 80' long. Process is continuous, twenty-four hours a day, seven days a week. 3. Aerial view of Palmetto installation at Pierce, Florida.

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Strong Words on Pricing

"PERHAPS I'VE BEEN AROUND too long and am suffering from the cynicism inherent in the older generation," writes a man well known in the chemical industry. "But I cannot help snorting when you cry crocodile tears about the price situation. Last thing that would occur to you is that CHEMICAL WEEK, through its pie-in-the-sky market projections, is largely responsible for seducing feather-merchants into reasonably well-balanced areas of the chemical industry with subsequent price demoralization when the projected volume fails to materialize."

We plead not guilty. But even if we are guilty, we contend that we have offset any overoptimistic market projections with properly pessimistic reports of current and future overcapacity for many products.

But our correspondent (who prefers that his name be withheld) sets forth some other views on pricing. He argues, for example, that a generation ago the industry was spearheaded by a relatively few strong companies managed by a handful of imperious, realistic individuals. While these men may have been short on science, they were tough managers who knew their markets intimately, and made profits.

As that generation passed, their companies under professional "managers" (most of whom have trivial investments based on bargain-price stock options) found that they could no longer make an adequate profit in their own long-established markets—not because price and volume had deteriorated but primarily because committee management by echelons of Parkinson's Law "executives" failed to run a tight ship.

Their alternative to admitting inability to perform in a long-established area of sales is to promise the dear stockholders fabulous future profits by entering some other areas. The promised profits may not be forthcoming, but at least the day of reckoning is postponed several years—perhaps even beyond that magic day of retirement, when all problems pass to the next generation.

But—and this, he says, is where CHEMICAL WEEK provides the spark that starts the holocaust—projections of "plenty of volume for all" must be made. So the market researchers come up with New Frontier numbers—to be achieved in '65 . . . or, safer still, in '70. With such future volume assured (at present prices and profit margins), many weak sisters enter alien businesses as a cure for profitless prosperity in their original areas. And each allocates to himself a goodly share of the future growth in volume. Multiplied by the number of newcomers, these projections soon lead to two or three times the needed capacity—"and all because old established producers are so unreasonable as not to be content with a decreasing share of a going business while holding a price umbrella over inept newcomers.

"I think," he concludes, "that you should declare a moratorium on public projections of volume into the distant future. I think you should take a stand for market 'research' only by men who have successfully sold in the markets they are researching. I think you should urge management to require a list of future customers and volumes that the sales manager 'guarantees' to sell before it okays additional capacity.

"Quite a few other things would also help, but a good first step is a moratorium on market research by wet-behind-the-ears theorists who have never sold a pound of the materials they so blissfully project."

Our correspondent has excoriated CHEMICAL WEEK, professional managers, advocates of diversification, and market researchers. That's quite a pack to take on single-handed. There's a grain of truth, perhaps, in each of the accusations, but we suspect that there's also a bushel of exaggeration. What do you think?

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Action on Manpower

TO THE EDITOR: In your article titled "Call to Arms Sparks Manpower Survey" (*CW, Aug. 12*) you suggest updating information regarding the military status of employees.

You may be interested in the enclosures, which show how we have reacted to your suggestion.

GEORGE E. MELLGARD
Manager-Personnel
Pittsburgh Coke & Chemical Co.
Pittsburgh, Pa.

Mr. Mellgard enclosed a questionnaire on military status and an accompanying memorandum directed to all salaried personnel—ED.

Profit Starts in Plant

TO THE EDITOR: This is in reference to your Viewpoint (*Aug. 26, p. 7*) titled "Can We Lick Low Prices?" insofar as it pertains to standard commodities.

From my own observations, many of the executives who blame their financial problems on low prices could at least reduce their problem by more serious efforts at cost reduction. The larger companies usually accumulate more than enough manufacturing cost data, but often do not realistically and consistently tackle the problem of reducing these costs. The owners of small companies are often so sales oriented that they do not have adequate data on manufacturing costs, and do not realize the potential savings.

Cost reduction in chemical manufacture is usually obtained not by cutting payrolls but by investigating, improving and then closely supervising yields on raw materials. Increased production with existing equipment and elimination of excessive use of utilities are usually secondary in magnitude.

The normal procedure is to have a good chemist study the process to ascertain the maximum yields obtainable with the minimum processing cost. An experienced production engineer then balances this against actual plant performance and estimates the cost savings obtainable if the plant operations were reasonably close to laboratory data.

Management's problem is to provide competent personnel for this, provide the time and facilities they need, and provide the necessary followup. Competent personnel for this are in short supply because in recent years a larger proportion of the better chemists and engineers go into research and engineering work as being more interesting than plant operations.

Also, to managers cost reduction is not as interesting and glamorous as planning expansion programs, which is perhaps one reason why the chemical industry now has too much capacity and too slim profit margins.

JOHN BURTON
Chemical Consultant
Cranford, N.J.

Smog Optimism

TO THE EDITOR: The California Motor Vehicle Pollution Control Board is not quite so steeped in gloom as you seem to be in [your] article (*Sept. 2, p. 26*). As a matter of fact we are optimistic about the prospects for reducing auto smog.

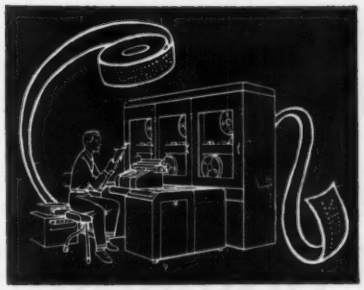
We're going to take two definite steps this week that will go a long way toward solving the problem. First, the board will probably approve criteria for exhaust-control devices, including the one that calls for the device to operate effectively for 12,000 miles. Second, the board will give formal approval to the first crankcase emission-control device. This is the same device now being installed voluntarily on all new cars being shipped to California from Detroit.

What approval means is that the voluntary program for installation can be stepped up for all used cars. As you probably know, the compliance portion of California's law does not go into effect until at least two devices in each category are certified.

At the same time, the board is reviewing eight applications for exhaust

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 West 42nd St., New York 36, N.Y.



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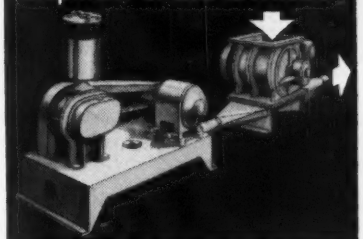

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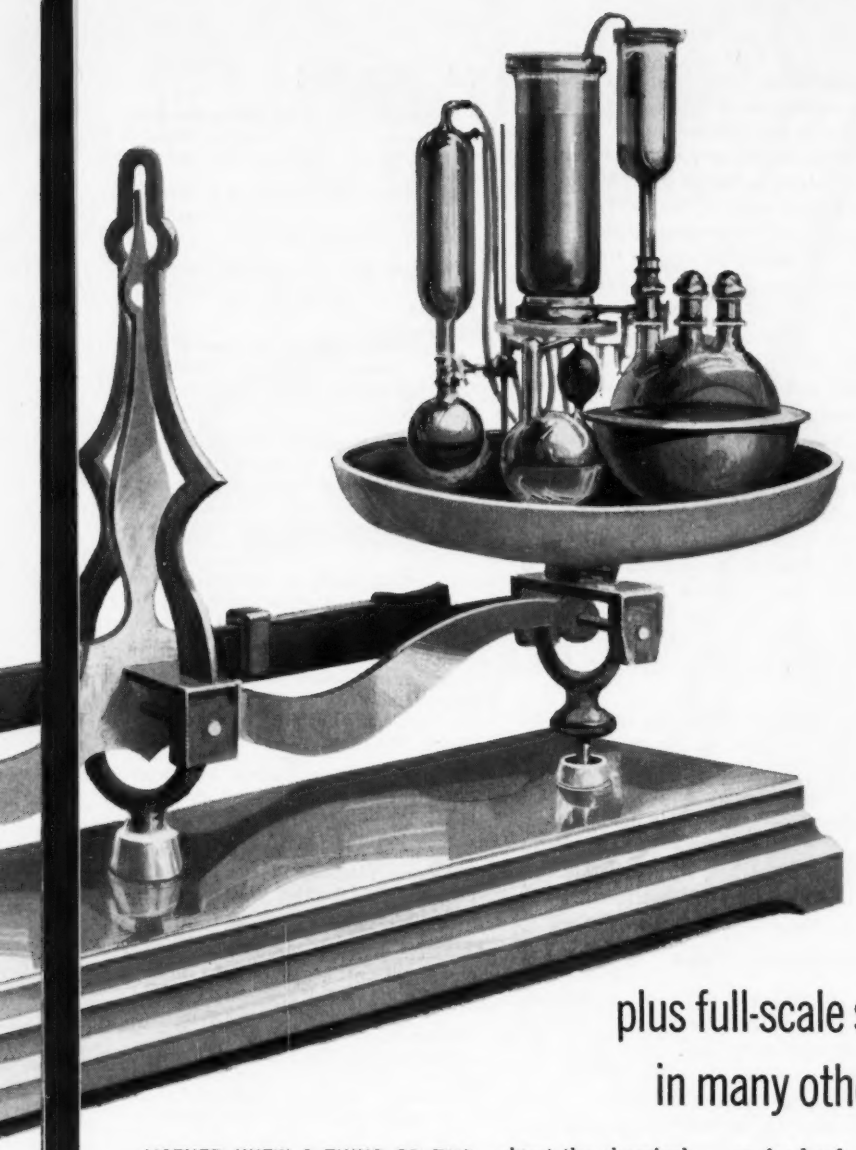

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MOTHER KNEW A THING OR TWO—about the chemical cleaning of metal. When her copper pans began to look dingy, she banished the tarnish with lemon juice — which, as we all know, did an admirable job because of its high citric acid content. You, of course, don't have to rush out and start squeezing lemons. We stand ready to supply you with all the citric acid you might need for metal cleaning—not made from lemons, but produced in our unique deep-fermentation process and notable for its purity. You'll find it a sight better than Mother's method for removing tarnish, as well as rust and scale, and in preparing all manner of metals for electroplating.

WE LOVE TO BE COAXED — by friendly type customers to add new products to our line of chemicals. Our next happy surrenders will include sodium citrate and acetyl-tributyl citrate (or, if you prefer, citrate esters). The latter, we are told, come in mighty handy as food-safe plasticizers in the manufacture of polyvinyl chloride films.

THE BEAUTY OF BUTYL — can be a fading thing when the antioxidant used is susceptible to color instability or staining. For those in the Butyl rubber business who do not enjoy living with these uncertainties, Miles is supplying SUCONOX® 12 (N-lauroyl-*p*-aminophenol) and SUCONOX® 18 (N-stearoyl-*p*-aminophenol) for polyethylene. Results from the field indicate that life at the rubber works can, indeed, be beautiful. People who have tried it say that SUCONOX® 12 is the best all-around nonstaining antioxidant for Butyl rubber. Among its endearing properties is its resistance to pH changes encountered in the course of slurry system polymerizations and its nonstaining characteristics. We could go on and on, but our technical bulletin on SUCONOX does it better. Yours for the writing. MD-1-1

MILES Chemical Company

Division of Miles Laboratories, Inc. Elkhart, Indiana – COngress 4-3111

controls and four for crankcase devices.

Some of the biggest companies in the United States, including Du Pont, Minnesota Mining and Manufacturing and American Cyanamid, are researching the problem, although they have not submitted formal applications.

While we are very hopeful of a breakthrough soon, obviously this is not purely an automobile manufacturing problem since it does involve chemistry, physics, air engineering, etc. . . .

Our board is charged with the responsibility of seeing that these devices shall not be an "undue cost burden to the average motorist," and we are determined to keep that as reasonable as possible without sacrificing effectiveness or efficiency. It is true that the board is under a great deal of pressure both from the public and from the device manufacturers to certify something, but we cannot afford to be pressured into a hasty decision.

Consequently, while it seems as if we are proceeding slowly, actually we are pioneering an uncharted area.

We would like to point out that many states and cities in other parts of the world with similar problems are watching our work and will undoubtedly adopt many of the rules and policies being determined in California for the first time.

In fact, this is the first positive approach to motor vehicle-created air pollution ever undertaken. . . .

RAY KORVITZ
Motor Vehicle Pollution
Control Board
Los Angeles

Kraft Odor Control

TO THE EDITOR: Your article "Killing Odors by Chemical Reaction" (*Sept. 9, p. 125*) was very interesting; however, in regard to kraft pulp-mill odor abatement the article failed to cover another important method now being used by many mills to prevent 80-90% objectionable odors from getting to the atmosphere.

The largest source of odor in a kraft pulp mill results from the reaction of residual sodium sulfide in the weak black liquor with water vapor in the multiple-effect evaporators and carbon dioxide in the direct-contact evaporators. Both reactions lead to the formation of hydrogen sulfide released to the atmosphere.

This can be prevented by stabilizing the sodium sulfide in the black liquor, reacting it with air (oxygen), producing stable sodium thiosulfate. In this way the sulfur is kept in the system and recovered.

As a result of stabilization, instead of the usual salt cake makeup, soda ash [usage] is only 75% that of salt-cake, and it contains the same amount of sodium per mole; [hence] the weight of makeup chemical is 25% less. In many areas of the country this means a chemical makeup savings of as much as 75¢/ton of pulp produced.

Of course, the other sources of odor, such as the digester blow and relief gases, are not affected by stabilization. They can be controlled by the methods outlined in your article as well as by incineration and chlorination.

It can be seen that by coupling the methods described in your article with stabilization, a kraft pulp mill can in most cases eliminate odor and save money at the same time.

F. A. EMMERLING
Prenco Systems
Watertown, N.Y.

Pharmacy Fees

TO THE EDITOR: You mentioned in your article "Drug Sellers Taking New Marketing Tack" (*July 29, p. 52*) the "so-called Friesenecker Plan." What you describe, however, is usually described as the "professional fee" concept.

This concept has been used by pharmacy for many years, being based on adding to the cost of the drug or ingredients dispensed a professional fee for professional services rendered.

This is the first time, however, that we have heard the professional fee concept described as the Friesenecker Plan. We assume that you have in mind Earl Friesenecker, a past president of our Chicago branch. We doubt, though, that Mr. Friesenecker would attempt to take credit for a concept as old as the professional fee concept you described. . . .

GEORGE B. GRIFFENHAGEN
Managing Editor
Journal,
American Pharmaceutical Assn.
Washington, D.C.

MEETINGS

Engineers Council for Professional Development, 29th annual meeting, Sheraton Sellbach Hotel, Louisville, Ky., Oct. 2-3.

International Astronautical Federation, 12th International Astronautical Congress, Washington, D.C., Oct. 2-7.

Southern Research Institute, coal technology conference, Birmingham, Ala., Oct. 3-4.

American Society of Mechanical Engineers, process industries conference, Shamrock-Hilton Hotel, Houston, Tex., Oct. 4-6.

American Society of Mechanical Engineers, American Institute of Mining, Metallurgical and Petroleum Engineers, 24th annual joint solid-fuels conference, Dinkler-Tutwiler Hotel, Birmingham, Ala., Oct. 5-7.

American Society for Engineering Education, annual North-Midwest meeting, Michigan College of Mining and Technology, Houghton, Mich., Oct. 6-7.

American Institute of Mining, Metallurgical and Petroleum Engineers, Society of Petroleum Engineers, fall meeting, Dallas, Tex., Oct. 8-11.

Water Pollution Control Federation, Milwaukee Auditorium and Schroeder Hotel, Milwaukee, Wis., Oct. 8-12.

Technical Assn. of the Pulp and Paper Industry, plastics paper conference, French Lick-Sheraton Hotel, French Lick, Ind., Oct. 9-11.

American Rocket Society, space flight report to the nation, New York Coliseum, New York, Oct. 9-15.

Second Conference on Nuclear Reactor Chemistry and fifth Conference on Analytical Chemistry in Nuclear Reactor Technology, Oak Ridge National Laboratory, Gatlinburg, Tenn., Oct. 10-12.

National Conference on the Administration of Research (15), University of Puerto Rico, San Juan, Puerto Rico, Oct. 10-13.

Chemical Engineering and **Armour Research Foundation,** conference on the new trends in chemistry, Sheraton Towers Hotel, Chicago, Oct. 11-12.

Western Petroleum Refiners Assn., waste disposal and stream pollution conference, Hotel Lassen, Wichita, Kan., Oct. 11-12.

The Fiber Society, fall meeting, U.S. Hotel Thayer, West Point, New York, Oct. 11-13.

American Vacuum Society, eighth annual symposium, Washington, D.C., Oct. 16-19.

National Safety Council, 1961 National Safety Congress and Exposition, La Salle Hotel, Chicago, Oct. 16-20.

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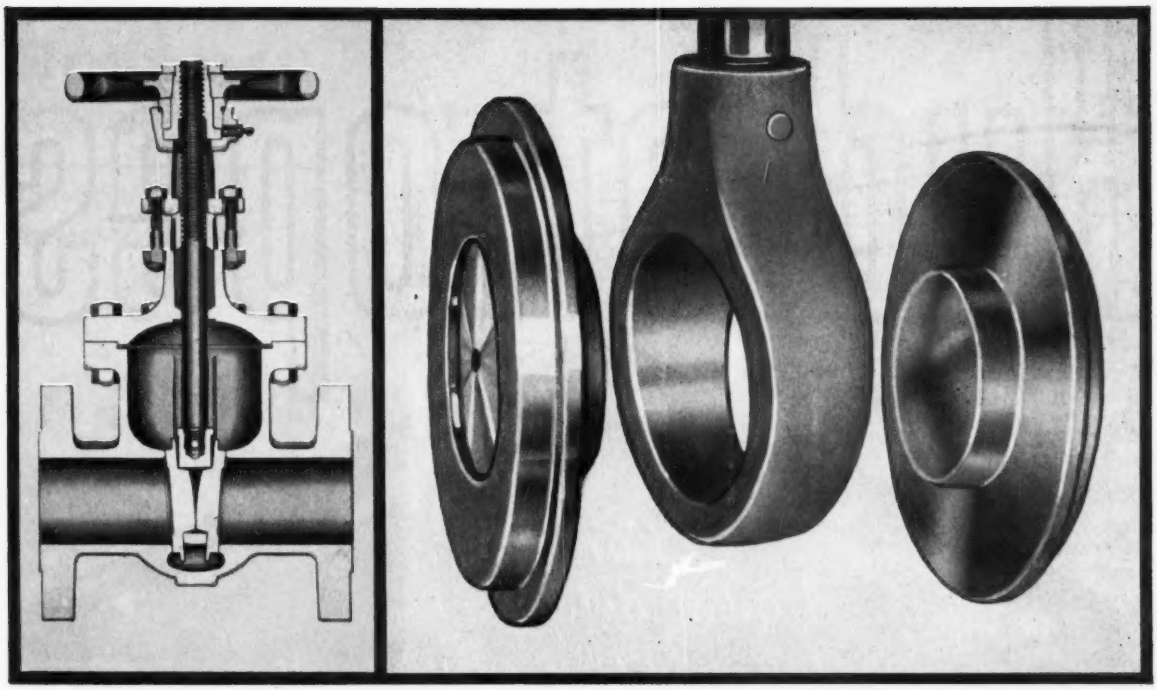

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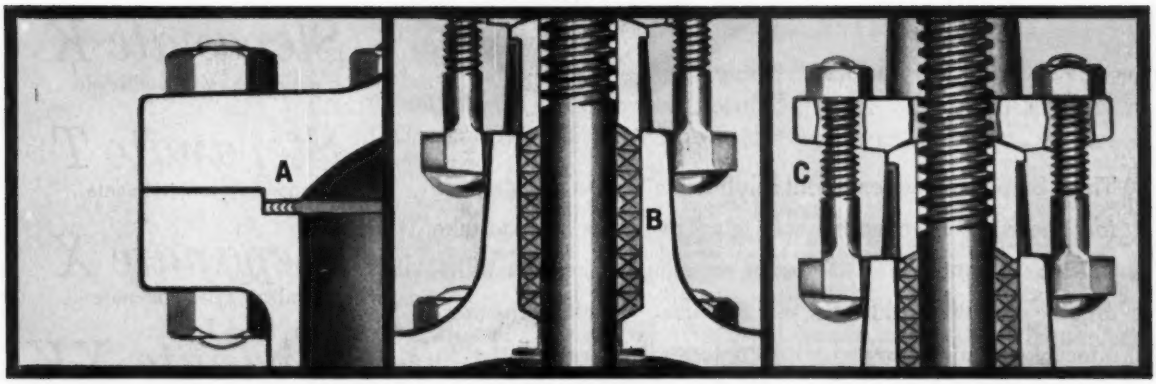

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Business
Newsletter

CHEMICAL WEEK
September 30, 1961

Spain may get a $120-million petrochemical complex. The deal, brewing for some time, involves the government agency Instituto Nacional de Industria, several foreign companies, including Imperial Chemical Industries, Royal Dutch/Shell, Montecatini, Phillips Petroleum, Farbewerke Hoechst, and two Spanish firms, Union Espanola de Explosivos and Gros.

Reportedly, the private capital groups will build a ring of petrochemical units around a refinery and a light oil cracking plant to be constructed by INI at Puertollano in central Spain. INI would have a minority interest in each such unit. Initial capacity of the state-owned refinery would be 1.2 million tons/year, which eventually would be expanded to 2 million tons.

Output of the cracking plant (ethylene, propylene, butylenes) would funnel to ICI for polyethylene, Montecatini for polypropylene, and Phillips for synthetic rubber. Roles that Shell and Hoechst will have in the setup haven't yet been defined. Actually, no hard agreements have been signed by any of the companies, and, despite the months-long negotiations, a pact may still be some time off.

•

Another subsidiary for Diamond Alkali. Acquisition of Fiber Chemical Corp. (Cliffwood, N.J.) via an exchange of stock, was disclosed by Diamond Chairman and President Raymond Evans late last week. The New Jersey concern, with annual sales of approximately $1.5 million, is a supplier to the detergent, paper, textile, and leather markets.

Diamond recently acquired Bessemer Limestone & Cement (Youngstown, O.) and won control of Chemical Process Co. (Redwood City, Calif.) in a share-buying contest with commercial solvents (*CW Business Newsletter, Aug. 5*).

•

Virginia-Carolina Chemical's need for nitrogen to firm up its basic fertilizer position could mean (1) producing its own (despite a current financial pinch), or (2) signing take-or-pay contracts with an existing nitrogen producer. Officials, not disclosing details, admit V-C's requirements would tie up a "sizable plant." If the company goes ahead with its own nitrogen unit, it might be built near Birmingham or St. Louis.

At last week's V-C stockholders' meeting a record 85.9% of those eligible voted, with 77.5% of preferred and 89.3% of common shares backing President Justin Potter and his board. Chief dissenter was Morton Adler of New York. His contention: Potter is running V-C to favor common stockholders over preferred.

•

Deadline extension for Harvey Aluminum? Probably. It has until the end of the week (Sept. 30) in which to notify the Bonneville Power Administration of the site it has selected for a new, 75,000-tons/year

aluminum reduction plant in the Pacific Northwest (*CW, July 22, p. 27; Aug. 26, p. 22*). The firm will likely apply for—and get—an extension. It has a contract running through '80 for electric power for the plant (which would double its Pacific Northwest Primary aluminum capacity).

Incidentally, Harvey will soon decide on a Caribbean site for its proposed $35-million, 150,000-tons/year alumina plant.

•

Canada's New Brunswick area will get a caustic-chlorine plant. Late last week Canadian Industries Ltd. revealed plans for a $5-million installation to be completed in '63. Precise site was not fixed. Salt, the major raw material, will come from Nova Scotia and output of the new plant will go chiefly to the pulp and paper industry.

CIL is only one of a number of U.S. and Canadian chemical makers that, for the past five years or so, have been weighing the feasibility of such a unit for the Maritimes. Two years ago the K. C. Irving interests, which pledged to bring new industry to the area, planned construction of a caustic-chlorine plant near Saint John, N.B. Recent squabbles with Saint John municipal officials reportedly forced Irving to withdraw this pledge, thus apparently opening the field for others. CIL jumped in first.

The New Brunswick operation will be CIL's third chlorine-caustic unit. Others are at Shawinigan, Que., and Cornwall, Ont.

•

And a Saskatchewan chlorine-caustic plant may be on the way. It's listed as the last of a three-part integrated herbicides-making "complex" planned by Interprovincial Co-operatives Ltd. (Winnipeg, Man.). First two stages—production of 2,4-D and 2-methyl-4-chlorophenoxyacetic acid (MCPA), and a formulating unit—will begin this winter with installation of equipment on a large tract of Saskatoon property.

Cost of this part of the project is an estimated $2.2 million. The Saskatchewan Government Finance Office has authorized an industrial loan of up to $1.25 million for construction of the plants.

The chlorine-caustic plant will utilize salt that underlies the site, but details have not yet been disclosed on cost data or timetable for this phase of the operation.

•

Negotiations are in progress for sale of Minnesota Mining and Manufacturing's Zenith Plastics Co. division at Gardena, Calif. Prospective purchaser: H. I. Thompson Fiber Glass Co. (Los Angeles). No contract has been signed yet, but "basic principles of the agreement have been determined," say 3M President Herbert Buetow and Hitco Board Chairman Harry Thompson.

Sale of the Gardena facility will avoid competition against plastics fabricating customers of 3M's Reinforced Plastics Division (St. Paul) and will fit in with Hitco's long-range growth plans to consolidate and expand its southern California production facilities for "aerospace" industry products.

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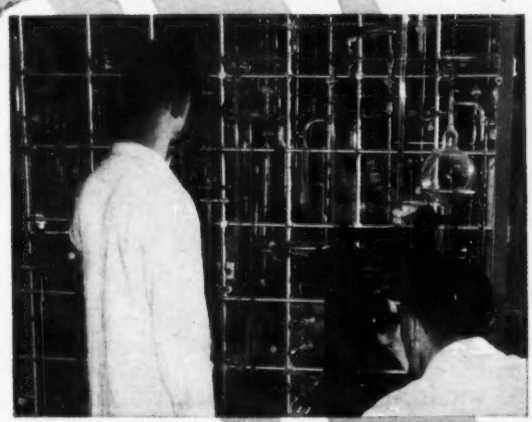

Chemists checking crucial phase in development of a new Wilmar polymeric plasticizer.

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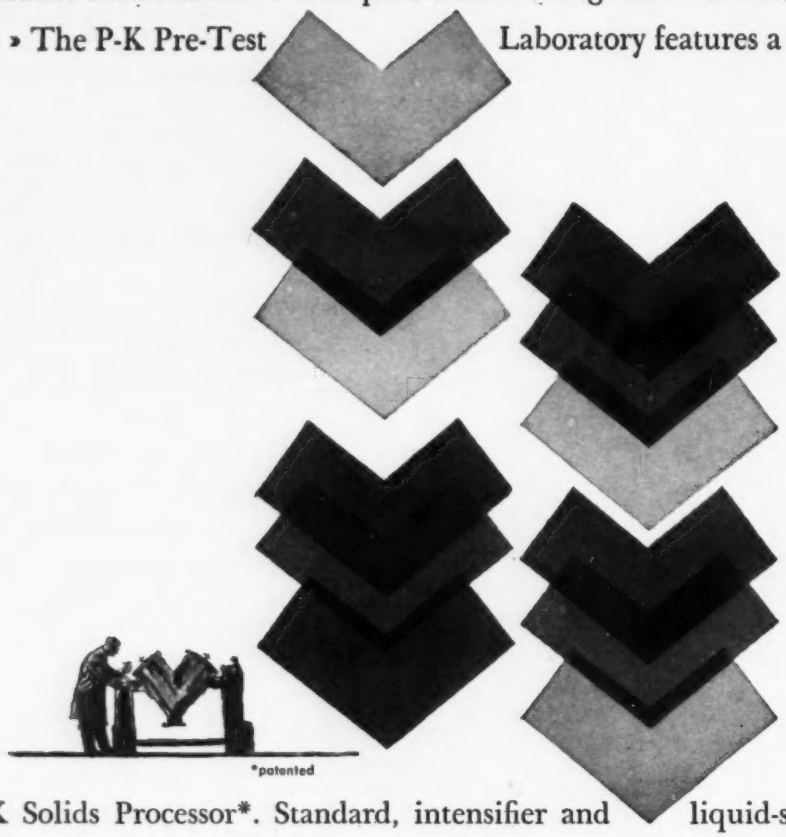

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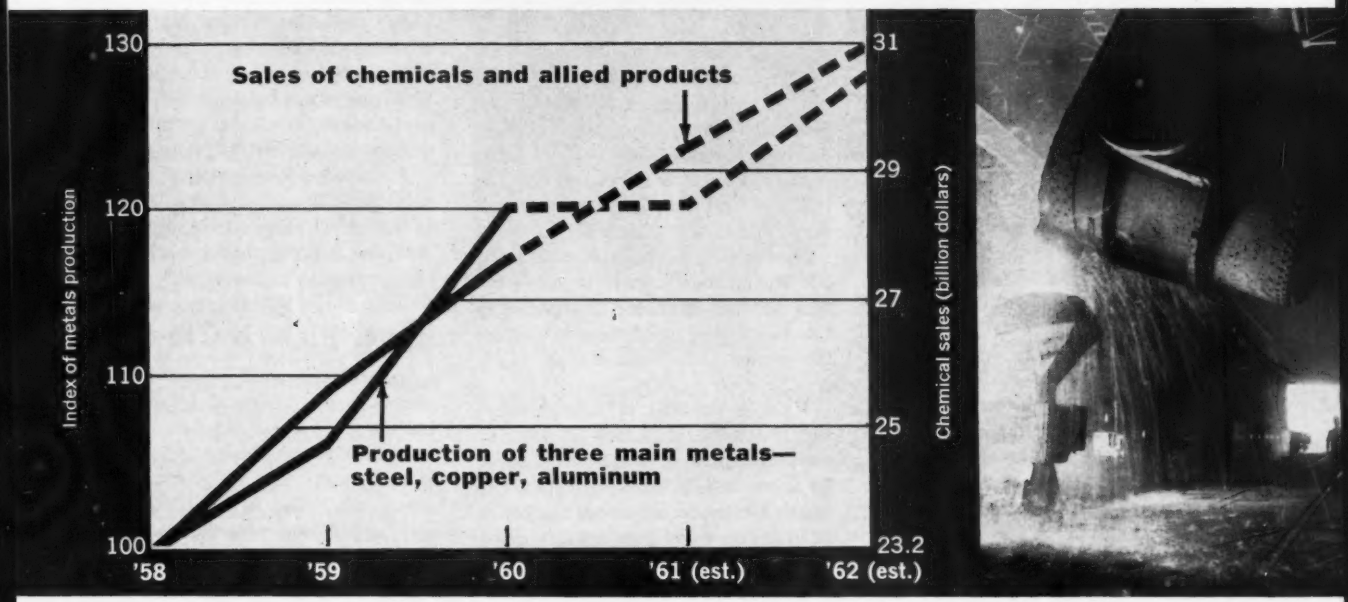
Moving Up with the Mainstream Metals



Lifting Sights on Chemical Sales

With the U.S. economy increasingly taking on various "boom" characteristics, the ending of the third quarter this week brings potent signs that the chemical industry can now raise its sights on sales targets this year and next.

As forecast late last week by Chris F. Bingham, vice-president (chemical sales) of Pittsburgh Plate Glass Co., sales of chemicals and allied products this year are likely to exceed the previously predicted $29 billion and next year will reach a record high of more than $30 billion. Bingham appraised prospects for each of six major segments of the chemical industry in a speech at the ninth annual marketing conference of the National Industrial Conference Board, held in New York's Waldorf-Astoria Hotel.

More bullish chemical sales totals for this year and next are a distinct possibility, judging from the historical relation between chemical sales and production of three big-volume metals—steel, copper, aluminum and taking into account such noteworthy factors as the current speedup in defense procurement. On this basis, chemical industry sales appear headed toward marks of at least $29.4 billion this year and possibly $31 billion in '62 (*chart, above*).

For More Power, Sooner: Diplomatic and military crises in Berlin and elsewhere have impelled the Kennedy Administration to accelerate the buildup of U.S. military power.

Already there has been a noticeable step-up in production of conventional munitions (*CW Washington Newsletter, Sept. 9*).

It's now calculated that the Defense Dept.'s major procurement and production program will call for a more than 28% rise in expenditures, to about $18.4 billion, in the current fiscal year that started three months ago.

Heavily involved in these plans are steel, copper and aluminum—e.g., the Pentagon last week asked FMC Corp. (formerly Food Machinery and Chemical) to rush production of M-113 all-aluminum armored infantry vehicles so that some of these units can be shipped promptly to U.S. troops in West Berlin.

Autos, Building, Utilities: Other developments auguring greater usage of steel, copper and aluminum include substantial progress toward new labor contracts in the auto industry and predictions for possibly a 15-20% increase in U.S. auto production in the '62-model year just starting; recent showings of growing firmness in both residential and industrial construction; and ambitious expansion plans on the part of the gas and electric power utilities.

Between now and '70 natural gas pipeline companies plan to spend $29.4 billion for expansion; and U.S. electrical power companies plan to invest more than $8 billion in transmission facilities (*CW, Sept. 23, p. 26*).

Viewing these factors in the light of import-export trends and other national and international developments, metal producers all are optimistic but in varying degrees. Steelmakers, who turned out not quite 99.3 million tons

PPG's Bingham foresees two new records for chemical sales in '61-'62.

of ingots and castings last year, look for totals of about 100 million tons this year and possibly 105 million tons in '62. Refined copper production—which last year spurted to 1,675,400 tons—is expected to inch upward to 1,680,000 tons this year, then climb to 1,750,000 tons in '62. Primary aluminum production is predicted to hit 2 million tons this year (about the same as last year), then move on to about 2.2 million tons next year (*CW Market Newsletter, Sept. 23*).

These metals—whose principal applications are in the mainstream of the national economy — have close links with various aspects of the chemical business. For example, production of steel requires sulfuric acid, oxygen and other chemical products, and also involves production of benzene, naphthalene and other coke-oven chemicals. And some of the biggest markets for these three metals—e.g., construction, autos and other transportation equipment, and appliances—are also major markets for plastics, paints and other important chemical products.

Still another reason for upping previous estimates of '61 and '62 chemical sales: considerably steeper gains in over-all industrial activity than were anticipated at midyear (*CW, June 24, p. 111*). At that time, the Federal Reserve Board's index of industrial production was expected to hit 112 in October; actually, it reached that point in July and went on to 113 in August.

Texas to the Moon

Oil and chemical technology on the Texas Gulf Coast will be augmented next year with a generous serving of space technology. The National Aeronautics and Space Administration has selected a site about 22 miles southeast of downtown Houston for a $60-million laboratory to be used for planning and putting together a Project Apollo men-to-the-moon spacecraft. Some 1,600-1,800 persons will be employed at the lab initially—and about half of them will be engineers and scientists.

News of NASA's decision brought one fragmentary answer to the question of what Humble Oil & Refining Co. will do with its 35-sq. mile tract on the former Jim West Ranch (*CW, Nov. 5, '60, p. 21*).

Humble donated to Rice University two adjacent parcels of land at the southern tip of that tract. One, of 24 acres, will be used by Rice's Research Center for advanced studies in earth sciences and oceanography. The other, of 1,000 acres, was given to Rice with the understanding that it would be used for the NASA project.

New Entry in Coin-ops

Detrex Chemical Industries (Detroit) last week became the first U.S. chemical company to plunge all the way into the coin-operated drycleaning business. Previous entries were mainly appliance manufacturers (CW, March 19, '60, p. 105).

For Detrex, this move shapes up as a logical adjunct to its principal business as a major producer of laundry and drycleaning chemicals and equipment. The company's plant at Ashtabula, O., produces chlorinated hydrocarbons and anhydrous hydrogen chloride, also turns out degreasing solvents, alkali cleaning compounds, phosphate coatings and rustproofing materials.

After seven years of research and field-testing, Detrex is coming out with a new coin-operated drycleaning machine with a "stabilized perchlorethylene" solvent system that—according to company President A. O. Thalacker—cuts cleaning and drying time in half and also cuts operating costs. While a competitive machine will clean and dry a 9-lb. load in 50-65 minutes, the Detrex machine, Thalacker says, will do the same job in 27 minutes. And a Detrex-developed sensing element is said to determine when the load is completely free of solvent.

Current marketing plans call for 50-50 distribution through the company's own distributors and through distributors of other coin-operated drycleaning equipment throughout the U.S. and Canada. Intended outlets: professional drycleaners and established coin-laundry operators.

Thalacker anticipates that the new coin-ops will add substantial volume to his drycleaning division by '62. And, he figures, chemical sales will be proportionately increased.

Bayer Picks a Chief

Farbenfabriken Bayer — West Germany's largest chemical company — has chosen 51-year-old Kurt Hansen as chairman of its board of directors. Hansen, who has had chemical industry experience in Germany, India and the U.S., succeeds the late Ulrich Haberland, who had been the Bayer chief since the end of World War II (*CW, Sept. 9, p. 48*). Haberland died Sept. 10.

Hansen received a doctorate in chemistry and a diploma in business administration from Munich's Institute of Technology in '35 and '36, then joined Bayer's predecessor company (I. G. Farben). Since '57 he has been a director, also general manager of both the research and production departments for pharmaceutical and agricultural chemicals.

Bayer's Hansen: As chemist and executive, a three-continent career man.

Putting More on Paper

Scott Paper Co. is organizing a new affiliate in Japan.

The new Japanese company, Sanyo-Scott Co., Ltd., will be capitalized at $3 million with Scott subscribing to half of the common stock and Sanyo Pulp Co. (Tokyo) subscribing to the remainder.

Scott has followed the same ownership-sharing policy in Canada, Mexico, Colombia, United Kingdom, Belgium, Italy, Philippines and Australia. Sanyo, a leading Japanese pulp and paper manufacturer, and Scott will each have three members on the board of directors of the new company. Its president will be Tsunekazu Namba, who is also president of Sanyo. Japanese employees will fill virtually all production and administrative jobs in the new company. Scott will supply technical advisors, marketing experts, and engineers.

Thomas McCabe, president of Scott proffered a number of observations last week at dedication ceremonies for its new, $15-million executive offices and research-engineering center near Philadelphia.

He expects his company's performance to "keep pace with the general economy of the nation." Earnings were up 4.2% in first-half '61, compared with the similar period in '60. Sales were up 3.3%. Total net income in '60 reached a record $27,729,943, an increase of 11.8% over '59.

McCabe says there's no single reason why the company was able to increase earnings, particularly during the recent recession. He believes that "excellent performances" by employees had a lot to do with it. More than half of all Scott workers are shareholders in the company (under a stock purchase plan in operation more than 30 years), and this, McCabe believes, has helped keep morale high.

Another reason cited for Scott's good payout record: its excursion into plastic (e.g., urethane, polystyrene) products such as a new disposable drinking cup for both hot and cold liquids. But McCabe declines to pinpoint sales in nonpaper products. He does credit research, especially in recent years, with boosting company profits, says the firm plans to "materially" expand research during the next five years, both in the U.S. and abroad.

Wyandotte's Semple: Looking for 'further geographical balancing.'

Eying Chemical Metals

Although now unenthused about acquisitions, Wyandotte Chemicals will be spending capital funds at an in increased rate this year and next, aiming at "further geographical balancing" of its production plant system.

Company President Robert Semple told the New York Society of Security Analysts last week that although its J. B. Ford Division will be operating five widely separated plants in the U.S. and Canada by next month, the Michigan Alkali Division's production is concentrated at two large facilities and one smaller plant.

Two Tracts Ready: The company already owns tracts of land in two other locations that can be used for chemical plant sites: a 24-acre industrial plot acquired several months ago at Ontario, Calif., about 35 miles east of downtown Los Angeles; and a 200-acre tract assembled about 12 years ago on the Ohio River at Dilles Bottom, O., about three miles west of Moundsville, W. Va.

Capital spending, Semple says will rise from last year's $6.1 million to $8-10 million this year and about the same amount in '62. Depreciation this year will be up "several hundred thousand dollars" from last year's $8.6 million.

Wyandotte has been doing research on refractory metals "whose processing is more chemical than metallurgical," but has not decided on going into production of such metals. Also the firm has been researching liquid and solid propellants under government contract, but neither has that project "opened any great commercial opportunities for us," says Semple.

Growing in Organics: Wyandotte intends to keep its position in chlorine and alkalis, which now account for more than 25% of the company's approximately $100-million/year sales volume. And the management is "pleased" with results on ethylene and propylene oxides and derivatives. In little more than a decade, Semple notes, Wyandotte's organic chemicals sales increased from $3 million to about $20 million/year.

When its new $3.5-million unit on the Michigan site is completed (*CW Business Newsletter, June 10*), Wyandotte will have more capacity for propylene oxide than for ethylene oxide. Propylene oxide output represents a captive market for some of Wyandotte's chlorine output, whereas direct oxidation is used for ethylene.

This has been "a pretty good year" for Wyandotte, with sales now expected to be somewhat more than last year's $97 million. Earnings, Semple predicts, will be about the same as last year's $4.9 million. Over-all plant operating rate is nearly 80%.

Pushing Up on Potash

Two firms were pushing ahead last week on Canadian potash projects.

International Minerals & Chemical Corp. (Chicago) negotiated a $40-million, 20-year loan from Prudential Insurance Co. Purposes: to finance a $10-million expansion of the potash mine and refinery of IMC's Canadian subsidiary near Esterhazy, Sask. (*CW Business Newsletter, Aug. 19*); a $3.2-million diammonium phosphate plant under construction in Florida; a $4-million expansion and cost-reduction program in other Florida phosphate operations; a $1-million conversion to a new monosodium glutamate fermentation process; retirement of a $10-million revolving credit loan; and refunding of $5.5 million in notes due July 1, '64.

U.S. Borax & Chemical Corp. named R. E. Kendall—engineering manager at Boron, Calif., the company's biggest plant—as project manager at Saskatoon, Sask. He will coordinate all engineering and geological studies on possible large-scale potash production there (*CW Business Newsletter, Sept. 2*).

Plastics Pace New-Products Boom

Company	Tradename	Product	Applications
Allied Chemical	Aclar	Fluorhalocarbon film	Packaging
	Capran	Polyamide film	Packaging
	Actol	Propylene oxide polyether	Rigid and flexible foams
Atlas Powder	G-2566; G-2571	Sorbitol polyether, urethane grade	Rigid urethane foams
	Tween-mos	Powdered blend of non-ionic emulsifiers	Ice cream emulsifier
	Brij	Polyoxyethylene fatty alcohol	Alkali-stable cosmetic emulsifiers
Celanese Corp.	SX3H	Heat-stable latex emulsion	Textile coatings and finishes
	Cellugard 150	Water-based hydraulic fluid	Hydraulic systems
	Celcon	Acetal copolymer resin	Replacement for metals
Dow Chemical	Zetafin	Polyolefin copolymer	Molded plastics
	Styrofoam	Fire-resistant urethane foam	Insulation
	Thurane	Rigid urethane foam boards	Insulation
	Zoamix	Zoalene	Poultry coccidiostat
Du Pont	V-54 Primer	Solvent-free paint	Hot-rolled steel surfaces; commercial marine end uses
	Dycril	Photopolymer printing plate	Printing, emblems, signs
	Baymal	Colloidal alumina	Textile size and finish, high-temperature adhesives
Eastman Chemical Products	Tenite Polypropylene	Polypropylene	Injection molding, blow-molding, extrusion into film and monofilament
	Texanol	Neopental configuration alcohol	Nonphthalate based plasticizers
Enjay Chemical	Enjay Butyl HT 10-66	Chlorobutyl rubber	Tubeless tire liners, conveyor belts, steam hose
	Enjay Butyl Latex 80-21	Butyl latex	Butyl tires, textile and paper coating, paints, roofing
	Buton 150	Diolefin surface coating resin	Metal primers and coatings
FMC Corp.	Oxiron 2000, 2001, 2002	Epoxidized polyolefin	Surface coatings, reinforced plastics
Hooker Chemical	.....	n-octyl mercaptan; n-octyl chloride	Intermediates for many specialty chemicals
Pennsalt Chemicals	Hinac	Chromate-based corrosion-resistant coating	All metals, especially nonferrous
	Aquathol	Endothol-based aquatic weed killer	Ponds, reservoirs
	Kynar	Vinylidene fluoride resin	High-performance plastics applications
Reichhold	Polylite	Urethane elastomers	Clay pipe gaskets, molds, tools
	Foundrez ESL 1485	Furfurylated amino aldehyde resin—sets by catalytic action	Binder for sand cores used in metal casting
Rohm & Haas	Rhoplex R-9	Vinylidene chloride acrylic copolymer	Greaseproof coating for paper
	Rhoplex B-83	Modified acrylic copolymer emulsion	Floor polishes
	Rhoplex AC-201	Thermosetting acrylic polymer emulsion	Industrial coatings
	Tuffak	Molecularly oriented acrylic sheet	Applications calling for rigid transparent material (not film)
Shell	Vapona	Phosphate-based insecticide	Farm and household use
	Ionol-H	4-hydromethyl-2, di-tert-butylphenol	Antioxidant
	Epon Foam Spray 175	Two-component foamable liquid system	Low-temperature insulation

Last week's conference on new-product development in high-polymer coatings, held on the campus of the University of California at Los Angeles, spotlighted the chemical industry's most fertile growth area: plastics and plasticizers.

Discussed at the meeting were dozens of new polymers—nearly all of them still in the laboratory stage. And a CHEMICAL WEEK survey bears out industry estimates that resins and plasticizers will account for about 40% of the new chemical products going into commercial production this year (*see table at left for some of '61's major newcomers*).

A report on Monsanto's work to improve dispersion of pigment and polymer particles in latex paint drew considerable attention. John Heaps told how Monsanto's Plastics Division has found a way to side-step dispersion problems in latex paint by surrounding each pigment particle with polymer vehicles. Most promising approach: a heterogeneous mixture of latex and fine-particle emulsion of fatty ester. It was learned that Monsanto expects to market such a self-thickening latex paint soon.

Other promising developments listed by Charles Overberger, head of Brooklyn Polytechnic's chemistry department: nitroso-fluorocarbon elastomers of high molecular weight and good stability, produced by Minnesota Mining and Manufacturing and the Army's Quartermaster Corps; polymers with mercapto side-chains, under study by Du Pont; and Union Carbide's Diels-Alder-type films that are said to be stable at 400 C.

Chemical research has risen sharply each year since the early '50s. (CPI spending for research has increased at an average rate of more than 10%/year over that period.) Most industry observers say that the full impact is just beginning to be felt, and that the current annual average of 400 new chemical products is due to rise steadily during the '60s. Accelerating this trend: as research becomes more competitive, companies will have to speed up development of new products; the traditional seven years from tank car to test tube may be reduced substantially in the near future, if indeed it is not already outmoded.

national roundup

Rounding out the week's domestic news.

Companies

Ellay Rubber Co. (Los Angeles) has purchased Charles Crowl Co. and Crowl Chemical Co. (El Monte, Calif.), which will be operated as Ellay Laminates, division of the parent company. Ellay will continue to supply the Crowl line of press-planished sheets and panels for the aircraft industry, will also add new products for application in furniture, radiation shielding and building panels.

North American Coal Corp. (Cleveland)—which in recent years has been diversifying into chemical and other noncoal operations—has listed its 1,589,603 shares of common stock for trading on the New York Stock Exchange. The stock—currently selling at about $18/share—previously was traded over-the-counter. NACC is building a 40,000-tons/year aluminum sulfate plant in southern Ohio, due onstream by year's end (*CW, Dec. 10, '60, p. 26*).

Baird Chemical Industries Inc. (New York) has completed acquisition of Barlow Chemical Corp. (Ossining, N.Y.) (*CW Business Newsletter, Aug. 19*). Baird will market Barlow's Barquat quaternary ammonium compounds and Barlene tertiary amines.

John Deere Chemical Co. has moved its executive and sales offices from Pryor to Tulsa, Okla. Administrative, sales, accounting, traffic and advertising departments are affected by the move.

Expansion

Rock Salt: Sifto Salt Ltd., subsidiary of Dominion Tar & Chemical, is sinking a new, 1,800-ft. shaft at its rock salt mine at Goderich, Ont. The $1.6-million project, due for completion in two years, is part of a $3-million development plan that will boost capacity 50%.

Aluminum: Reynolds Metals (Richmond, Va.) has purchased an aluminum fabrication mill at McCook, Ill., from the Navy for $7.7 million. The Navy originally acquired it for $16.3 million and used it to produce tapered aluminum sheet and plate for its aircraft during the Korean War.

LPG Hydrocarbons: Continental Oil Co. (Houston, Tex.) plans to build a natural gas processing plant in the company's Sacatosa field in Maverick County, Texas. The plant—to be completed by next March—will process up to 2.5 million cu.ft./day of natural gas, turning out up to 18,000 gal./day of propane, butane and natural gasoline.

Fatty Acid Esters: Chemol Inc. (Greensboro, N.C.)—a newly organized company headed by Stanley Frank, president of Carolina Byproducts Co. (Greensboro)—is building a 10,000-sq.ft. plant to produce a line of fatty acid esters and hydrogenated oils and fats for use in textile chemicals, plastics and rubbers. Initial plant investment: about $250,000. The unit is expected to go onstream in November.

foreign roundup

Rounding out the week's international news.

Polyethylene/Pakistan: Two German firms—Salzgitter Industriebau GmbH. and Braunschweigische Maschinenbauenstalt—have received an order for a high-pressure polyethylene plant to be built in Pakistan. The project, first of its kind in that country, is to include a plant to produce alcohol from molasses, and units to manufacture ethylene, high-pressure polyethylene, and finished products. Capacity: 5,000-6,000 lbs./year of polyethylene granulate. Completion target: end of '63.

Fertilizer/Jamaica: A group of U.S. investors is reportedly backing construction of a 60,000-tons/year organic fertilizer plant in Kingston.

The plant will receive all the city's garbage for processing. Jamaica Agricultural Society will distribute the finished product.

Resins/India: Reichhold Chemical Co. (White Plains, N.Y.) and Simpson & Co. Ltd., subsidiary of Amalgamations Private Ltd., have formed Reichhold Chemicals India Private Ltd. The new firm will build a $420,000 plant at Madras to produce synthetic resins for India's textile, surface coatings, adhesives, and plastics industries; $2.1 million has been earmarked for future expansion.

Investments/India: Podar Sons Pvt. Ltd. (Bombay) is seeking U.S. financial and technical backing for three projects to be built in India: auto tires and tubes (capacity: 1,000 units/day; capitalization: $4 million); polystyrene (7,000 tons/year, $3 million); polyethylene (3,600 tons/year, $3 million). Podar would put up 25% of the capital, the U.S. collaborator, 25%. Public subscription would supply the other half.

Better Odds for a Northern Ireland Chemical

With the United Kingdom likely to join the European Common Market, more U.S. chemical companies building abroad will probably be turning their attention to the British province of Northern Ireland (Ulster).

Hounded by a chronic unemployment problem, Northern Ireland has been courting foreign investment for the past few years, with some modest success. Since '45, 160 new developments or expansions have sprung up. U.S. companies have put in about $60 million.

A few large chemical projects have figured prominently in this inflow (*CW, Oct. 18 '58, p. 37*). Back in '56, Du Pont chose Northern Ireland for its first European manufacturing venture, and bought a 300-acre site at Maydown, near Londonderry. The following year it started building a 50-million-lbs./year neoprene rubber plant, which went onstream in '60. It's been gradually working up to full-capacity operation, and plans call for a 20% boost in capacity. This summer Du Pont revealed it planned to start construction later this year of a "multimillion-dollar" isocyanates plant at Maydown.

To supply the raw material for the neoprene plant, British Oxygen's subsidiary, Carbide Industries Ltd., put up an acetylene plant alongside.

Early in '58, Chemstrand Ltd.—wholly owned subsidiary of Chemstrand Corp.—started up its $9-million acrylic fiber plant at Coleraine, after considering 61 sites in the U.K. Now Chemstrand has a two-stage expansion under way—an immediate 50% increase of capacity to 15 million lbs./year, and an increase to 25 million lbs. by the end of '62.

British companies are bringing other chemical industry projects to Northern Ireland. Imperial Chemical Industries is building a Terylene polyester fiber plant on a 200-acre site at Kilroot, near Carrickfergus, and last week told of its plans to eventually produce polypropylene filament yarn there (*CW Business Newsletter, Sept. 23*). Courtaulds already has a rayon yarn plant at Carrickfergus (it opened in '50). And British Enka and its Dutch parent, AKU, will build a nylon plant at Antrim. They are forming a new company, British Enkalon, to run it. AKU will hold a 54.84% interest (the same share it holds in British Enka), and other British Enka stockholders will be given the chance to purchase the rest.

In another project, ICI will participate with Richardson Chemical Manure Co. in building a $5.6-million fertilizer and sulfuric acid plant at Belfast Lough. It's to be completed early in '63.

And hopes for further chemical development in Northern Ireland are spurred by the current construction of British Petroleum's refinery at Belfast—Northern Ireland's first. Initial capacity will be 30,000 bbls./day. It will produce motor fuel, kerosene, aviation turbine fuels, light and heavy diesel oils, fuel oil and liquefied petroleum gas, primarily for the local market.

Pebbles in a Pool: Unlike many areas seeking to attract industry, Northern Ireland is not industrially "underdeveloped." Its industrial tradition goes back to the British industrial revolution. Ulster's basic problem is economic and technological. Its major industries have been textiles—notably linen—and shipbuilding. But the British shipbuilding industry has long been in a slump, and so has much of the traditional textile industry.

Much of Britain's industrial expansion and diversification has passed Northern Ireland by. Until after World War II the local government was inclined to a *laissez faire* philosophy, didn't go out to attract industry. British manufacturers considered Ulster "out of the way"; and since unemployment was widespread they had no incentive to seek new sites.

The result has been continuing mass unemployment in Northern Ireland.

And although the number of new plants coming in has been heartening, they haven't really made much of a dent in the problem. Despite the 37,000 new jobs that have been created since '45 the unemployment rate remains about 7%.

Pulling Them In: Consequently the government of Northern Ireland has been trying to diversify its industrial base. The chemical industry is one of

Northern Ireland's Budding Chemical Industry

Belfast

James A. Beck & Son, Ltd. — hydrochloric acid, glauber salts, iron sulfate, etc.
Calocrete Products Ltd.—concrete and cement treatments.
H. J. Christie—hairdressing sundries.
William Clements—disinfectants, soaps, polishes.
John Everitt & Co.—branded preparations.
R. J. Groves & Son—insecticides.
Johnston & Christian Ltd.—bleach and ammonia.
Kilco Chemicals, Ltd.—fruit treesprays, DDT and benzene hexachloride insecticides, disinfectants.
Magowan Vicars (Chemicals) Ltd.—wood preservatives, disinfectants, cleaning compounds, woodworm eradicator.
Pemberton & Co., Ltd.—polishes.
Richardson Chemical Manure Co.—sulfuric acid, fertilizer.
Skinner Bros., Ltd.—manufacturing chemists.
Smyth & Co. (Chemicals), Ltd. — bleach, disinfectants, soaps, detergents, hair oils, etc.
Stormont Manufacturing Co. — insecticides, caustic soda, disinfectants, detergents, polishes, etc.
Tennants Textile Colours, Ltd.—textile pigment colors.
Ulster Oil Refineries, Ltd.—carpet dye.

Carrickfergus

Courtaulds, Ltd.—rayon.

Coleraine

Chemstrand, Ltd.—acrylic fiber.

Maydown

E. I. du Pont—neoprene rubber, isocyanates.
Carbide Industries, Ltd.—acetylene.

Industry

How Britain's prospective entry into the Common Market would favor Northern Ireland's prospects for attracting foreign chemical investments.

its main targets. Even though chemical plants generally employ a labor force that's small relative to investment, development officials believe they will be helpful in attracting other industries that use their output.

They believe Ulster offers the physical assets many chemical plants need —a lot of space, plenty of fresh water and easy effluent disposal, good harbor facilities—and that there are opportunities for plants using raw materials that aren't too bulky, or plants that can supply their own feedstock or turn out products that have a high conversion value. Petrochemicals, plastics, pharmaceuticals, man-made fibers, and some of the newer metals are considered possibilities.

To lure industries, Northern Ireland offers substantial financial incentives: outright capital grants to companies equal to one-third of their yearly capital expenditures (up to maximum yearly payments of $364,000 for machinery and $196,000 for buildings), loans for capital requirements, construction of plants for companies and rental at below market levels. Since '45 the development program has cost the government about $130 million, including $65 million for buildings.

Northern Ireland's economic plight results in other advantages to companies: low land costs, a large pool of labor already adapted to industrial life (including night shifts), wages somewhat lower than in England.

Reaching the Market: Since Ulster

Kilroot
Imperial Chemical Industries Ltd.—polyester fiber.

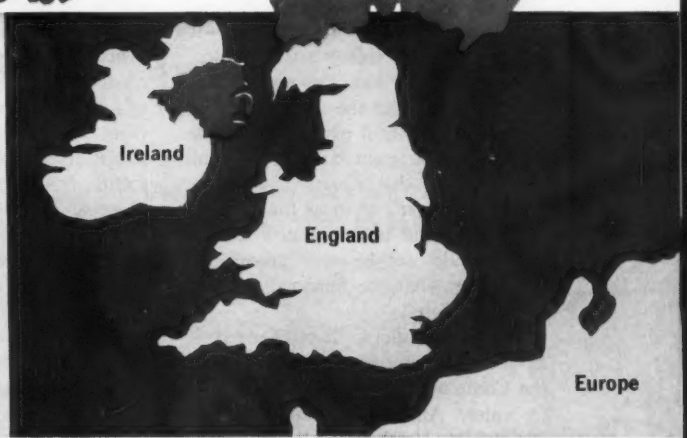
Sydenham
British Petroleum Ltd.—refinery.

Antrim
British Enkalon Ltd.—nylon-6 fiber and resin.
Nicrobrand Co.—nicotine and nicotine insecticid

Larne
British Aluminium Co. Ltd.—red oxide pigment.

Castlereagh
British Oxygen Gases, Ltd. — oxygen, acetylene, argon, nitrogen, propane, nitrous oxide, etc.

Londonderry
Ceca (Northern Ireland) Ltd.—activated carbon.



itself has a population of only 1.4 million, plants of any real size built there generally have to aim at markets elsewhere in the U.K., in Europe, or abroad. The Carbide Industries plant, which feeds Du Pont's neoprene unit, is an exception, of course. Also, Chemstrand does sell some of its viscose yarn to Dunlop's local tire-cord plant, though the bulk of it goes to apparel plants in England. And British Enkalon's nylon plant will probably find some local outlets.

If Ulster's development officials' hopes are borne out, more satellite plants like Carbide Industries' will appear, along with more plants that use chemicals. But such integration and local consumption on a large scale is still probably a long way off.

The major outlet for Northern Ireland's goods is the rest of the U.K., of course. And plants in Northern Ireland naturally get Britain's tariff advantages in the Commonwealth and the European Free Trade Assn.

The disadvantage of being separated from the rest of the U.K. by the Irish Sea has been overcome to a great extent by the development of good port facilities (Belfast is the U.K.'s third-largest port), and shipping services such as drive-on ferry services for trucks.

Chemstrand, for example, ships large lots on transports out of Belfast, and sends loaded trucks over the Larne-Preston ferry. Du Pont uses the same ferry, and also ships from a jetty at its Maydown site. Belfast is only 140 miles from Glasgow, 156 miles from Liverpool.

Getting into Euromart: But no matter how enthusiastically they waxed over Northern Ireland's attractions, until recently its boosters have been confronted by a stark fact—it is outside the European Common Market. Hence, like the rest of the U.K., it is outside the mainstream of European industrial expansion, which is drawing the great bulk of U.S. investment. If this situation were to continue, Ulster's chances for a really large and rapid inflow of new investment would not be very promising, no matter what the financial inducements proffered.

But the outlook has changed—Britain has applied for membership in the Common Market, and is expected to enter. Already, reports Kenneth Bloomfield, Northern Ireland's representative in the U.S., a number of U.S. companies have expressed interest in moving into Ulster in anticipation of Britain's entry into the Common Market.

If Northern Ireland does wind up within the Common Market, its biggest problem—unemployment—will become a powerful asset in attracting industry. For one of the major problems facing producers in the Common Market is the tight labor supply prevailing in most industrial centers. In Germany, it has already put a crimp in some chemical industry expansion. And the resulting pressure for higher wages is slowly driving up costs.

German and Dutch producers, in fact, have already come to Northern Ireland to recruit labor. But this doesn't solve their problem, since the Irishmen tend to go home when they can.

There are, of course, labor-surplus areas already within the Common Market—such as southern Italy and Sicily. But in those areas the people are much less educated than in Northern Ireland, and they lack the tradition of industrial employment and its necessary discipline of regularity.

For U.S. firms, moreover, Ulster has the added advantage of a familiar language and relative simplicity of currency operations.

Problems Too: Balancing these advantages are some problems. Chemical raw materials are almost nonexistent; local rails and road communications are poor; labor, though relatively cheap and plentiful, is mostly unskilled (particularly for chemical operations) and power costs are relatively high, though rebates keep them no higher than in the rest of the U.K.

How important these factors turn out to be depends, of course, on specific projects and products. Du Pont probably had to have a local supply of acetylene, but it will bring in the raw material for its isocyanates plant from elsewhere in the U.K. Courtaulds brings in coal from England, sulfur from the U.S. and France, charcoal from Belgium and Sweden, wood pulp from Scandinavia, the U.S. and Canada and also ships in liquid caustic soda. It makes its own sulfuric acid and carbon disulfide at the site.

While local labor is not now skilled for many of the necessary jobs in a chemical operation, the companies already in Northern Ireland have found that the workers can be readily trained. But just how much of an attraction this labor supply will be again varies widely with the type of operation. It may not be directly important for the more-capital-intensive industries—e.g., petrochemicals. Still it can take hundreds of men to build a plant, and a ready labor supply can speed construction. And many plants will use a lot of manpower: ICI plans eventually to employ at least 2,000 at Kilroot.

Internal transport may not be much of a problem if plants that export most of their output are situated near water.

Ulster's distance from continental Europe can be a drawback, depending again on the product, scale and competitive situation. To serve isocyanates customers on the mainland, Du Pont has a French plant; the Ulster plant will serve the U.K. and EFTA markets. On the other hand, its Ulster plant is Du Pont's only neoprene plant in Europe; output of this plant has been gradually replacing the company's exports from the U.S. to Europe. And Du Pont officials point out that the Maydown site is not designed for merely "a one- or two-product plant," that British entry into the Common Market could contribute to enlargement of the Maydown product line.

Competition: Ulster's labor surplus advantage in attracting new industry is shared by other areas in the U.K.; North England and Scotland have unemployment, and there are pockets of unemployment in the Liverpool area and other parts of Lancashire and Yorkshire. But these areas lack available plant sites. And with its unique local government setup. Ulster can offer greater financial incentives.

More potent competition for attracting foreign investors comes from Northern Ireland's neighbor, the Republic of Ireland. Ireland has also applied for membership in the Common Market. It has an unemployment problem similar to Ulster's, and offers foreign investors even greater financial inducements—cash grants that can cover the full cost of site and buildings and half of plant and equipment cost in selected "development" areas, and a 10-year tax waiver on profits earned from exports. Since these incentives were offered in the Industrial Encouragement Act of '58, more than 100 foreign industrial companies have come into Ireland.

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Washington
Newsletter

CHEMICAL WEEK
September 30, 1961

The Air Force is firming plans for a solid-fueled space booster to propel men to the moon. A decision will come in the next few weeks. President Kennedy ordered development of a 20-million-lbs.-thrust solid-fueled booster by the Air Force last spring when he decided to put the U.S. in the race with the Soviets to land a man on the moon. This would compete with development of a liquid-fueled engine for the giant Nova booster that will propel the three-man Apollo capsule to the moon.

Congress appropriated about $70 million to start development of the solid-fueled booster this year. But the program has been delayed because the National Aeronautics and Space Administration has not spelled out exactly what the Air Force's role is to be—and the Air Force has held up contracts pending such clarification. The vague understanding is that NASA will develop the vehicle, the Air Force the booster.

The Air Force would like to take over the entire project. This, it argues, would speed the program by making one agency responsible for all decisions. A top-level NASA-Defense Dept. committee under Nicholas E. Golovin is due to make recommendations on the solid-fuel program in November, dealing with just these matters.

•

A showdown over reciprocal trade is building in Congress for next year. "Protectionist" sentiment has been growing in recent years. And proponents of higher tariffs and quotas to protect American industry from foreign competition believe they now have the strength in Congress to emasculate the Reciprocal Trade Act, which comes up for renewal next June 30. This act is the cornerstone of U.S. foreign trade policy.

The Kennedy Administration is pushing in the opposite direction. It wants freer trade, as did the Eisenhower Administration. The White House is preparing a broad package for submission to Congress in January, calling for sweeping across-the-board tariff cuts. Some of his advisors are talking about offering subsidies to hard-hit domestic industries in exchange for freer trade authority.

President Kennedy probably will ask for a lot more than he actually wants. This allows for concessions and still a legislative victory. Outcome of the reciprocal trade fight is in doubt. But it's a good bet that any new tariff concessions made by Congress will be made grudgingly.

•

Sale of government-owned stock in General Aniline & Film has been recommended by the Justice Dept.—just as was done in both the Eisenhower and Truman Administrations. Byron White, Deputy Attorney General, told the House Commerce Committee last week that the department favors legislation that would permit the government to sell its 97% interest in General Aniline—as long as the company remains "under the control of nonalien interests." Proceeds from the sale would be set aside pending outcome of law suits.

Washington Newsletter

(Continued)

The government seized the stock in '42, charging GAF was controlled by enemy interests. The Swiss firm Interhandel is claiming in both U.S. courts and the International Court of Justice that it, not the German firm I. G Farben, is the true owner of the GAF shares. It is lobbying in Congress—successfully so far—to prevent passage of a sale bill. It wants the stock, not the money, if it wins its court cases. Termination of these is not yet in sight. Nor is passage of the disposal bill.

•

The price of silver has become a hot issue in Washington. A bloc of Western senators is pressuring the Treasury to either boost its sales price of about 91¢/oz. or stop selling from its diminishing free silver stock and let prices seek their own level—presumably higher. Fighting this are New England senators—with the support of an increasingly large number of chemical process industries that use silver in several processes, including production of film for cameras. What they want is repeal of the Silver Act, letting prices shoot up momentarily in the hope that they will come down later. What will come of the controversy is anybody's guess. President Kennedy has ordered a Treasury study of the problem—after Congress goes home.

•

Construction of the long-delayed Stanford accelerator in California will get under way this fiscal year. There had been some doubt about Congressional approval in the aftermath of the bitter debate that resulted in rejection of power generators for the huge nuclear reactor at Hanford, Wash. Hanford proponents suggested that they might kill all Atomic Energy Commission construction funds in retaliation.

Calmer heads prevailed, however. Congress finally gave AEC all its construction money for fiscal '62, except Hanford. This includes $26 million, out of an estimated $114-million eventual cost, to start construction of the two-mile-long linear accelerator at Stanford University. Congress also appropriated $4.5 million for research and development work in connection with the accelerator.

•

Potable water is flowing from the saline conversion plant at Freeport, Tex., despite considerable damage from Hurricane Carla. The Office of Saline Water reports only minor structural damage to the process equipment from the hurricane winds. But at the peak of the storm the plant was flooded with 6 ft. of sea water, causing considerable damage to pumps, motors, electrical switch gear and the instrument control panel. Initial estimates of damage: $75,000. Engineers worked around the clock —anticipating a need for pure water in the Freeport area—and had the plant back in operation within five days after the storm struck.

•

An important conference on use of drugs to treat cancer will be held in Washington Nov. 2-3. Discussion will center around results to date in the government's $25-million/year cancer chemotherapy program, conducted by the National Institutes of Health.

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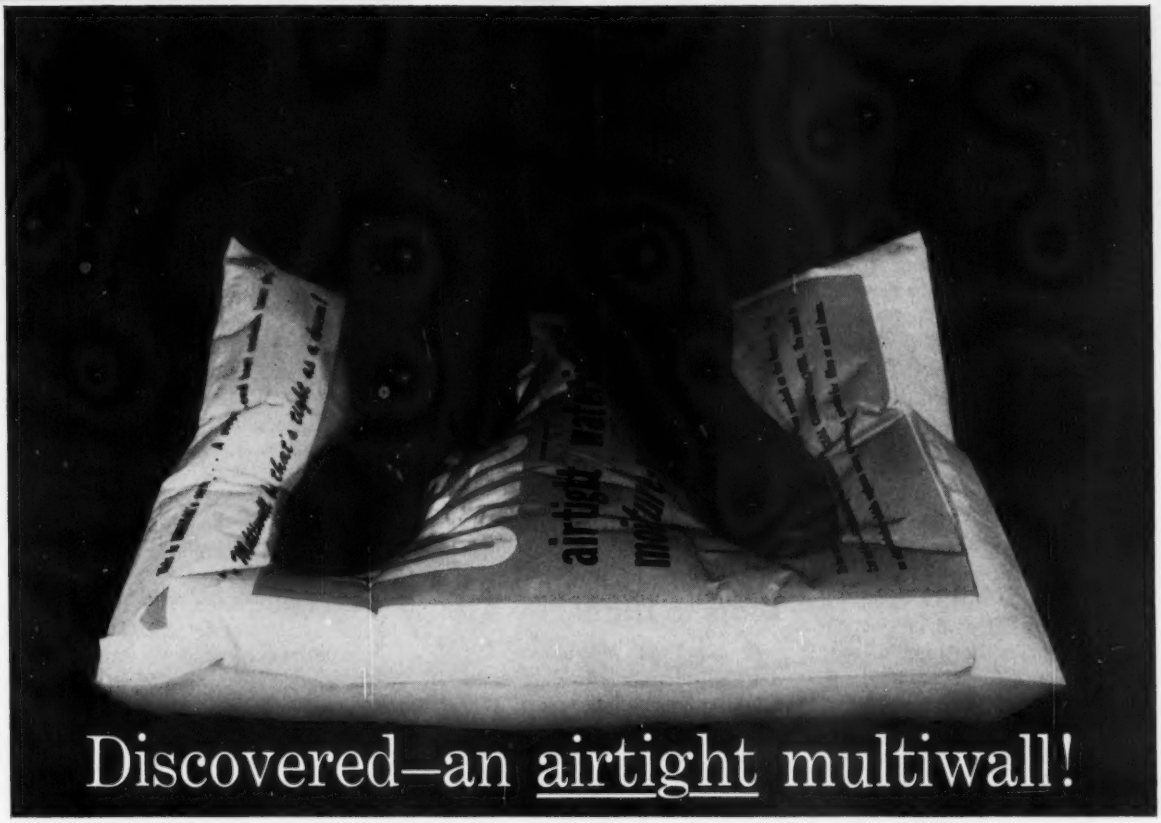

Discovered—an airtight multiwall!

Simple demonstration helps solve major packaging problem for Dow Chemical

The multiwall bag you see here contains nothing but air. The man standing on it weighs 200 lbs. Yet no air can escape. *That's because the bag is Union-Camp's amazing new UNISEAL.*

It ended a two-year search by Dow Chemical for a package that would provide a perfect vapor barrier.

Protection problem critical

The search began when Dow first developed an effective new crab grass killer. To successfully market this new product, an unusually tight package—even air-tight—was essential. The ideal package also had to be sturdy, printable, easy to handle and ship. And economical.

One day Dow engineers witnessed the UNISEAL demonstration you see above. If the bag could lock in air, then it must have the perfect vapor barrier. Further testing proved they were right.

Seals safely—and saves, too

The remarkable new UNISEAL bag features four plies. An outer sheet of semi-bleached paper (for top printability). Two middle plies of kraft. And an inner ply of kraft laminated to aluminum foil with polyethylene. A final extrusion coating of polyethylene resin over the foil serves as the heat-sealing medium for the inner seam and bottom.

The bag can easily be filled on *any standard filling equipment.* A special machine heat-seals the inner ply and applies adhesive to the tops of the outer plies. It then folds over the lip and pastes it to the outside of the bag. Finally, the machine centers a strip of gum tape over the edge of the lip to form a positive *air-tight* closure.

Apart from providing a perfect vapor barrier, Union-Camp's UNISEAL bag also turned out to be the least expensive container of any previously tried!

UNISEAL'S unique inner ply is made of kraft paper laminated with polyethylene to aluminium foil. Bags can be easily filled on any standard filling equipment.

Secret of sealing. Special machine heat-seals inner ply, folds lip over and pastes to outside of bag. Finally, gum tape is applied (arrow) forming a positive air-tight closure.

How much could a Union-Camp multiwall idea save you?

Hundreds of companies, large and small, have cut costs through Union-Camp multiwall ideas like this. Our comprehensive packaging service—5-Star Plan—covers bag construction, design, specifications control, packaging machinery and a survey of your plant. And it's free.

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Rugged Lube Defoams Too

Last week Dow Corning Corp. (Midland, Mich.) introduced a new line of fluorosilicone fluids and greases—fluoroalkyl groups attached to siloxane polymers (*CW Technology Newsletter, Sept. 23*). Because of their resistance to oxidizing chemicals and extreme temperatures (some are serviceable between −40 and +400 F) the products should be useful in a wide variety of plant applications ranging from valve lubrication to defoaming (*see picture*).

The fluorosilicones retain most of the useful properties of their silicone cousins and obtain the bonus of solvent resistance and better lubricity through substitution of fluoroalkyl for the more common methyl group.

The fluorosilicones now available include: (1) Dow Corning FS 1265 Fluid (designed as a lubricating fluid for use when insolubility in fuels and oils is needed, and as defoamer for solvent systems where conventional silicone defoamers do not work as well); (2) FS 1280 and FS 1281 (formulated as fuel-, oil-, and solvent-resistant, grease-like valve lubricants that can be used at extreme temperature ranges); (3) FS 1290 and FS 1291 (lithium soap-thickened lubricants, suitable wherever good lubricity is needed and where the lube is subject to the splashing of oils, fuels and solvents).

The big drawback now to widespread use of the products is the price tag—$25-45/lb. But DCC feels that the price should drop eventually to about $12/lb., the cost of its Silastic LS line of fluorosilicone rubber.

Lab technician compares FS 1265 defoamer (*left*) with untreated liquid.

Dials to Digits

If MacLeod Instrument Corp.'s (Fort Lauderdale, Fla.) new digital converter proves out as well as early tests indicate it will, the chemical industry may soon have a cheaper and more accurate substitute for conventional analog-to-digital converters. The device, simply mounted on the face of pointer or dial instruments (e.g., pressure or level gauges, flowmeters), converts the needle displacement into a digital signal.

According to James O'Maley, MIC's vice-president in charge of engineering, the instrument, called the Discon (digital scanner and converter), has manifold CPI applications. It appears useful for (1) process studies (e.g., material or energy balances) in which a few key instrument readings are scanned and fed to a data logger or printer; (2) computer control in which critical analog-type instrument readings are converted by the MIC device into digital computer input; (3) improving laboratory analysis accuracy (the instrument is said to have virtually eliminated human error caused by parallax, which sometimes occurs in colorimeter analysis).

Doubters: But the MacLeod instrument has hurdles ahead. As one chemical instrument expert put it, "There are a number of instruments of this type; they work in principle but never come through in practice." On the other hand, the Discon has already proved itself in such uses as scanning and relaying of weather bureau data and field-located gas meters.

The Discon, says MIC, is more accurate than most conventional transistorized analog-to-digital converters (it provides an accuracy of up to one part in 10,000). Unlike the transistor type, the new device imposes no load on the scanner instrument because there are no physical or electrical connections between them.

The scanner fits on the dial or meter face and photoelectrically translates into an electric pulse the change in angular position of the instrument's pointer over a selected time interval. This pulse, which is proportional to the pointer displacement, is then transmitted to an electronic unit, which converts it into a digital signal.

Cost Factor: Even if the Discon is found acceptable by chemical management from an accuracy standpoint, it will still have to justify itself economically. One Discon is probably less expensive than a transistorized analog-to-digital converter (a scanner costs $500; an entire unit, including the electronic readout, costs $1,500-2,000; typical cost of a transistorized unit is $4,000-5,000). But while the conventional converters can handle several instruments at once, the MIC unit requires one scanner for every pointer-type instrument. MIC reports however, that it can cut the high cost of multiple installations by feeding several scanner signals into one electronic readout device.

Test Plant Rental

Chemical management can now buy or rent a complete "package" trickling filter pilot plant to gather waste treatment and pollution data. It's a new service by Dow Chemical Co.'s Industrial Service Division (Cleveland).

The plan, according to Tom Powers, ISD's chief, is useful to both small and large chemical companies. Already units have been installed by two paper mills, four petroleum companies and in two chemical plants.

The idea has appealed to large chemical companies. Although they may have the know-how to build their own pilot plants, it's cheaper for them to use the package unit. Reason: costs of engineering and overhead associated with designing, ordering and buying the more than 15 separate parts totals more than the cost of the Dow unit. ISD units sell for $4,000

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or rent for $1,800—this covers the six-month period generally sufficient to complete the plant waste study.

Small chemical companies find the plan helpful too, especially if they do not have the technical know-how or the laboratory facilities to do the job themselves.

How It Works: Here's how the arrangement works. A chemical company with a water-pollution problem buys or rents the pilot plant. Dow will then run a preliminary analysis—e.g., BOD (biochemical oxidation demand)—to determine what type of nutrients are best for that customer's waste stream. The unit is then assembled on the plant site by an outside contractor to process 10-15% of the plant's waste stream.

The unit's effluent is analyzed regularly either by the customer—if it has the facilities—or by ISD, for a fee. Using the accumulated data Dow recommends the best design of trickling filter to handle the customer's full plant-waste stream.

Building the pilot plant to a full-scale unit is said to be no problem. Dow asserts that trickling filter plants up to 20,000 cu. ft. in volume have been scaled up from the 150-cu.ft. pilot unit.

The unit is a completely assembled tubular steel structure with rotary distributor, pumps, nutrient feeders ready to operate. The heart of the trickling filter is Dowpac 20A, a corrugated plastic packing that holds the active biological slimes.

EQUIPMENT

Flow Ratio Computer: A new flow ratio computer that provides direct measurement of multichemical flow ratios is now available from Republic Flow Meters Co., subsidiary of Rockwell Mfg. Co. (Chicago). RFMC says the device—accurate to 1%—is aimed at jobs now done by conventional ratio device plus two square root extractors. The instrument will sound an alarm or limit the flow of one liquid when ratios get out of balance. In addition, output can be recorded for reference or historical purposes, or used as input to a controller.

•

New Pump: Binks Manufacturing Co. (Chicago) is offering a new pump for high-volume, light or heavy corrosive chemicals. The pump, called the Pogo Hi-Volume SS (stainless steel), is designed to pump out 55-gal. containers. It's air-operated (air consumption is 2 cu.ft./minute/gallon pumped) and is rated for a delivery rate of 1.75-gpm. continuous-2.5-gpm. maximum.

•

Metering Pump: A new metering pump that precisely delivers small quantities of corrosive chemicals is being marketed by Scientific and Process Instruments Division of Beckman Instruments Inc. (2500 Harbor Blvd., Fullerton, Calif.). Beckman suggests the pump for such chemical uses as reaction rate studies, pilot-plant operations, and synthetic organic research. The pump is available in four ranges —2, 5, 10 or 20 ml./minute, with a reported accuracy of ±2%, repeatability, ±0.5%.

•

Weight Control System: Industrial Powertronix Inc. (535 N.W. 11th Ave. Portland 9) is out with a new continuous weighing system that automatically controls the weight in either dry-flow or combination dry-flow and liquid processes. Called the IPI Flo-Weight Controller, the system is a combination of a pneumatically operated "pinch" valve and IPI's Dry Flow Meter (*CW, June 24, p. 109*). According to its maker, the new system offers an accuracy of ±1%, low operating cost and maintenance, resistance to corrosion and abrasion, and easy installation.

•

Plug Valve: Rockwell Manufacturing Co. (400 North Lexington Ave., Pittsburgh 8, Pa.) is offering a new tapered plug valve claimed to be easier to turn, and resistant to freezing or sticking. A 0.0005-in. plastic coating applied to the tapered surfaces increases lubricity, reduces the coefficient of friction 10-fold over noncoated valves. Teflon is used for coating valves in service at pressures up to 1,000-psi.; phosphate-molybdenum disulfide is used for pressures up to 10,000 psi.

•

Nylon Pressure Tubing: Garlock, Inc. (Palmyra, N.Y.) says advantages of its new nylon pressure tubing are its flexibility, and its elimination of need for prebending, flexible couplings and intermediate fittings. The tubing will resist oils, greases, dilute acids and alkalis. It will withstand temperatures in the —40 to 185 F range. Two grades, for 1,000-psi. and 2,500-psi. service, are available in ⅛- to ½-in. sizes.

•

Miniature Vibrator: A lightweight vibrator no larger than a pack of king sized cigarettes is a new product of Martin Engineering Co. (Neponset, Ill.) for moving solids in hoppers, chutes and screens. A chrome-steel ball, driven by air, on raceways of hardened alloy steel, is the only moving part. Maximum air flow (6 cu.ft.-minute at 80 psi.) produces ball rotation of 22,000 cycles/minute.

•

Pipe Saddle: Insul-Coustic Corp. (42-23 54th Road, Maspeth 78, N.Y.) is out with a new pipe support with insulation that provides a positive vapor seal at the support for temperatures from 0 to 400 F. The pipe saddles are said to isolate pipeline vibration, give up to 90% vibration efficiency.

•

Oxidator-Aerator: The American Well Works' (Aurora, Ill.) new Mechanicomb combines a diffusion aerator, mechanical aerator and agitator in a single unit for accelerating treatment of sewage and industrial wastes. The unit introduces and distributes sparged and atmospheric air into the waste tank, increases oxidation efficiency by preventing sediment formation at the bottom of the tank.

•

Water Analyzers: Wallace & Tiernan Inc. (25 Main St., Belleville, N.J.) is offering two new instruments for water analysis. The DO-100 dissolved oxygen analyzer continuously measures and records micro quantities of dissolved oxygen in boiler and other high-purity water systems. The unit is electrochemical, direct acting, uses a hydraulic system and printed circuits. Indicator scale is calibrated for 0 to 25 or 0 to 250 parts/billion. Accuracy of readings is 5% of full scale. Oxygen changes of 0.1 parts/billion will register within 5-10 seconds after sample enters the instrument.

W&T's A-780 residual chlorine indicator continuously measures free or total residual chlorine in treated water. The chlorine acts on electrodes in a sampling cell. Sensitivity is 0.01 parts/million, registered within 10 seconds after sample enters the instrument.

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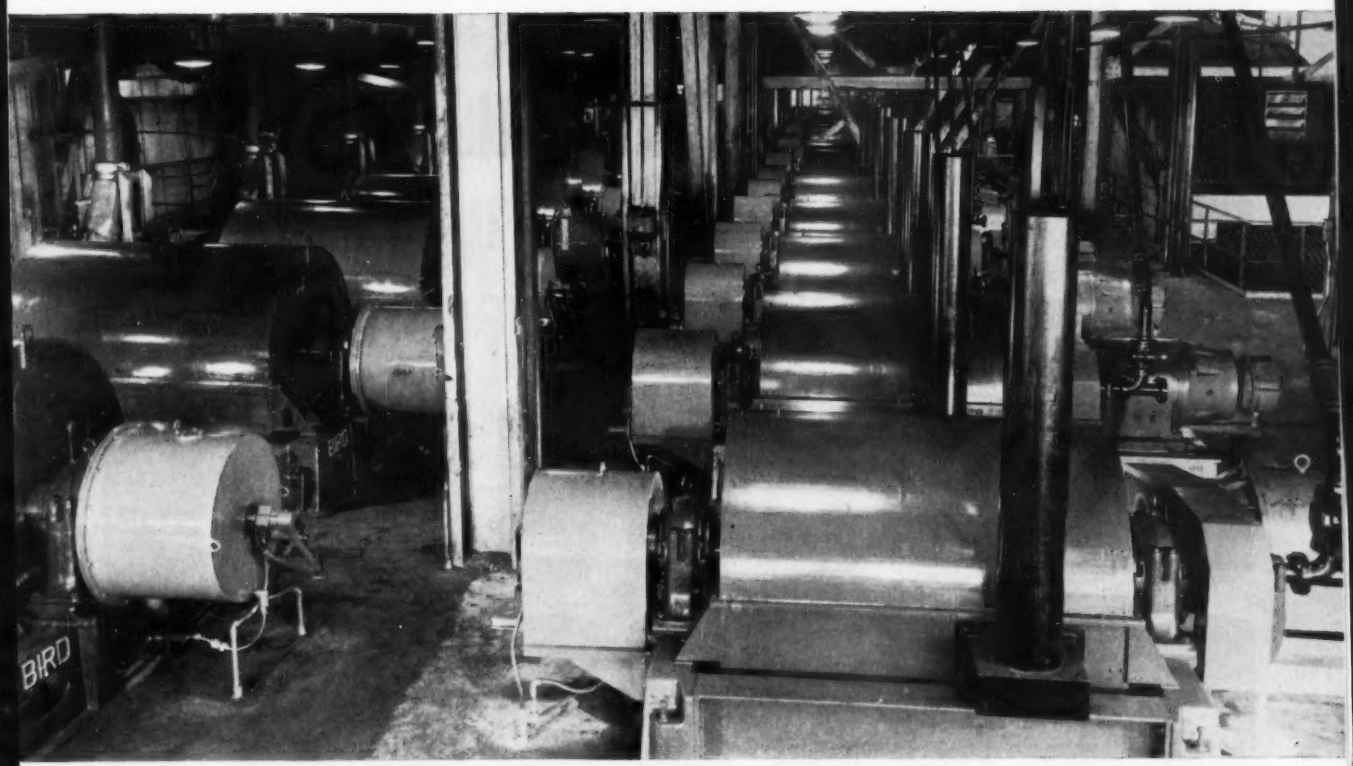

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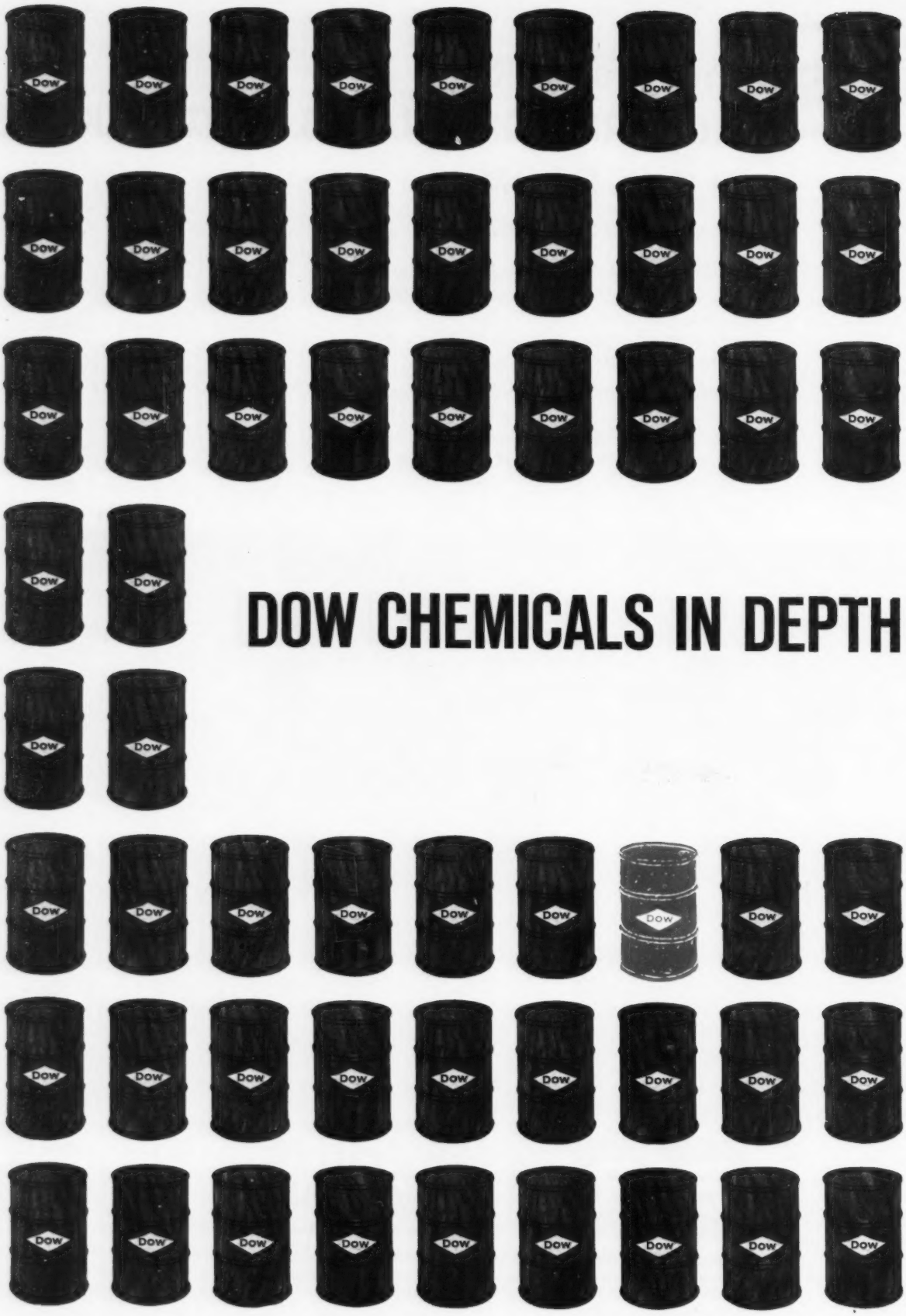
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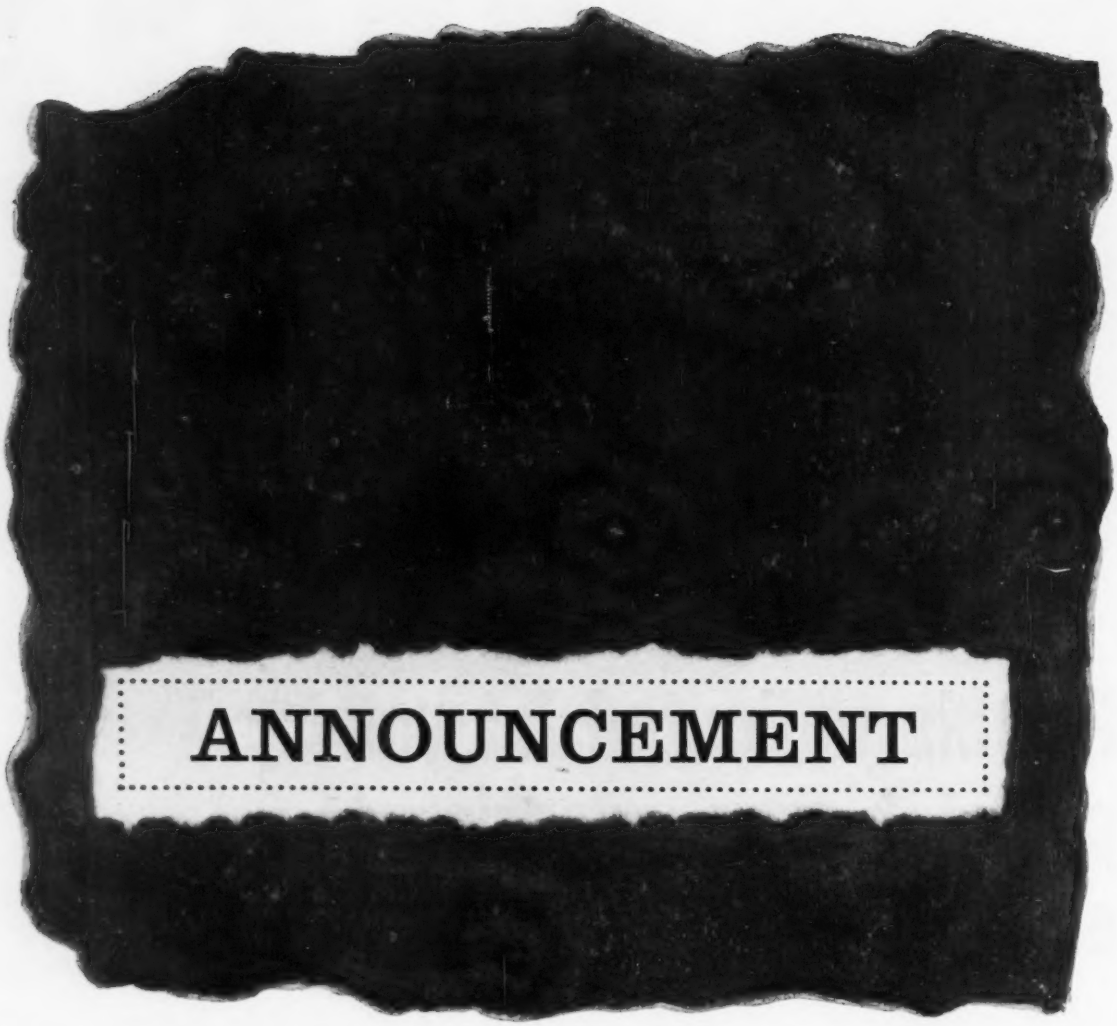

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CPI Fits Its Men for New Jobs

When the House Rules Committee this month blocked H.R. 8399—a bill providing government money for retraining workers in jobs threatened by new technology—it shifted the spotlight from federal retraining projects to private ones. And in the light of such publicity, the CPI's efforts stand high among industry.

Moreover, guidelines to the effective operation of such programs are beginning to evolve, and the case for tax relief to companies with such programs is winning new adherents—although relief so far is much less than companies desire. In any case, a recent CHEMICAL WEEK nationwide check shows, retraining is the policy of many CPI companies wherever it's applicable.

Management's obvious interest, of course, lies in keeping a contented, effective, continuous work force. And when a new product, new process, or process modification—key to profit growth—is put into a plant, the company does as much as it can to teach its workers about the new jobs, by retraining and upgrading them. Some recent examples:

• When Du Pont ceased making viscose rayon at its Old Hickory, Tenn., plant last month because the product was no longer profitable, the company was ready with plans for its displaced employees. Most of the rayon production force had spent hundreds of hours learning—at a $1 million-plus cost to Du Pont—the new and more complicated details of making Dacron. Thus prepared, most workers stepped into assignments at the recently built Old Hickory Dacron plant. Not all the 1,800-man rayon plant work force qualified for these jobs, of course. But the 14% who were not retrained received help in finding new employment and were given either termination pay or pensions.

• Xerox Corp. (Rochester, N.Y.), faced with a surplus manpower problem in switching from photographic paper to dry electrostatic reproduction machines, picked up a $100,000 tab for retraining eligible employees for other jobs within the company. The venture avoided layoffs, was praised by both labor unions and workers.

• Goodyear Tire & Rubber Co. (Akron, O.) has had a retraining program in existence for several years. Three floors in its six-floor Goodyear Hall building are devoted to general training. Hundreds of employees have been retrained for better and more responsible jobs in the company.

• American Oil Co. (Whiting, Ind.) recently established an 80-hour course to retrain workers for automation changes. A 300-page textbook, movies, film strips and field trips have helped prepare 220 men for new jobs.

Union Censure: Despite these private efforts, some national unions are resentful of Congress' failure to pass the retraining bill. The AFL-CIO calls the House Rules Committee's action "incredibly short-sighted." But local unions do not appear as perturbed, since many have seen that management is ready to install the schooling programs that will minimize loss and displacement of employees.

A noteworthy example is the experience of the International Chemical Workers local with Du Pont's Photo Products Dept. (Parlin, N.J.). In '58 Du Pont stepped up its modernization program but simultaneously began meetings with the union to get its reaction. The union volunteered some ideas and criticisms, which the company took into account in making its plans. Since '58, the 2,000 Parlin workers have had a relatively smooth adjustment to technological change in the bitterly competitive photographic film business.

When Du Pont set pay rates for new jobs, it welcomed realistic rate suggestions from the union. (About 40 job rates were increased when the union argued they needed more skill than originally expected.) When jobs were discontinued, under union contract provisions the senior employees got preference, "bumping" junior men out of their jobs. Unquestionably, some junior men lost jobs, but they were given plenty of opportunity to find new ones—and the basic staff was smoothly integrated into new positions.

Ease Off on Taxes: Companies agree

that federal aid would lessen management's retraining burden. But many prefer tax-relief measures along the lines advocated by Prof. George S. Odiorne, director of the University of Michigan Bureau of Industrial Relations. He says that giving corporations a tax break for retraining costs would accelerate the rate at which they make this investment.

Odiorne also claims that by arrangement of taxing procedures — under proper controls to prevent private gouging — private employers would be able to increase their investment in retraining and at the same time the problem would be put on a more businesslike basis.

Odiorne nails down his argument in this statement for CHEMICAL WEEK: "The practical advantages in tax credits, rather than doing the retraining of displaced workers through government procedures, are formidable. Vocational education procedures through testing, and general class work to fill statistical holes in the labor force, are so slow that they dishearten the man. The experience of a meat packing company in Oklahoma shows that training of workers for higher-level jobs must be pinpointed. This can be done only when an employer knows he can use the new skills."

Upgrading Chore: Chemical makers have a particularly important stake in retraining when the company is the only or principal employer in a community. And when such a plant closes, community life is disrupted.

Total employment in the chemical and allied industries (around 900,000) is now split 500,000 with "blue collar" production workers and 400,000 "white collar" men. But this ratio has been changing gradually in favor of the white-collar component — a change largely brought about by automation and new technology.

The trend has been apparent in all industry. Professional and technical workers have increased 64% since '50, service workers 26%, and office workers 25%. Production workers have increased at a much slower rate. That's the reason for the Kennedy Administration proposals to provide government financial support for training unemployed and "underskilled" workers for a place in the automated industries.

Bigger Work Force: Some major chemical companies have discovered that automation doesn't necessarily mean a smaller work force. At a southern Monsanto plant, installation of "computerized" operations has actually resulted in increased employment.

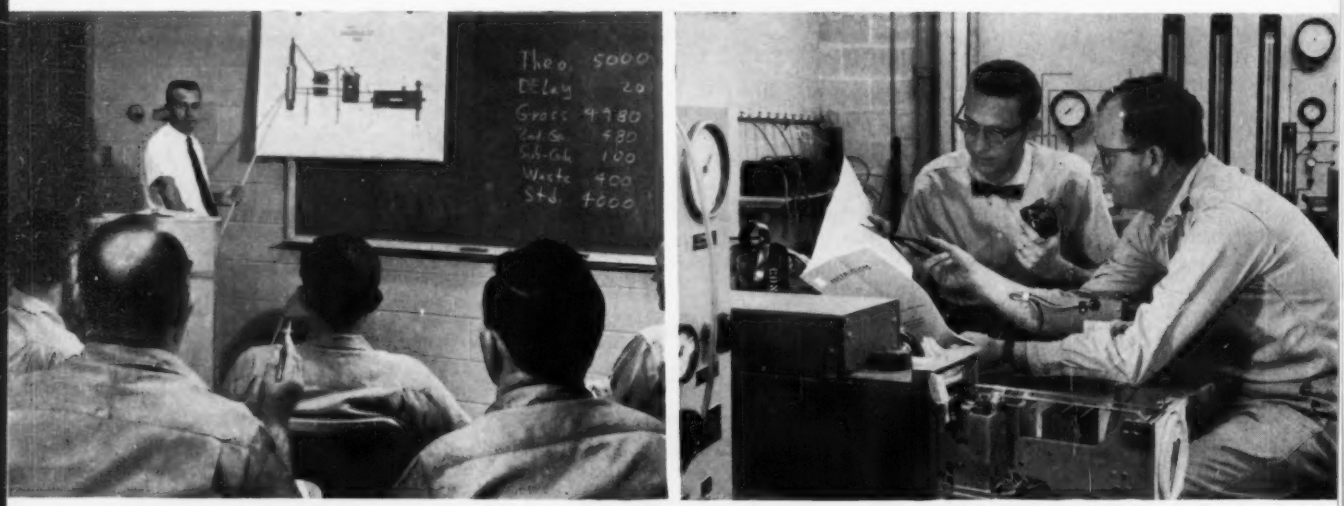
A Monsanto spokesman avers that "installation of a computer operation at a CPI plant ordinarily means only minor readjustment in personnel requirements. Object of the installation is to improve technology. It does not mean that Ph.D.'s are coming in one door while laborers are going out the other. Any necessary readjustment in personnel can be accomplished by retraining of employees."

Some major CPI companies tell CHEMICAL WEEK that they are not experiencing difficulties with retraining programs, because changes are occurring slowly. Case in point: Union Carbide is moving into automation cautiously — retraining as the need arises; surplus manpower is being absorbed with retirements, deaths and employees leaving voluntarily.

Need for Planning: Nevertheless, on the broad U.S. industrial scene, automation may in '62 cost an estimated 325,000 factory jobs. That's based on 16 million manufacturing jobs, and includes perhaps 20,000 CPI employees.

To minimize management headaches in carrying out the automation programs, a recent National Assn. of Manufacturers industrial relations workshop developed these recommendations, among others:

- Expect opposition initially from the union, particularly at the national level. More can be accomplished at the local union level and the employee level.
- Stress that automation is installed for only one purpose—to increase business, which means company security and job security.
- Decrease fear of job loss. Inform employees in advance about changes; publicize new methods and equipment and people who will operate it. Consider the older worker first —upgrade him if possible.
- Stress retraining as an integral part of technological change and automation. Sell the idea that retraining protects an employee's job under new



Classroom training was part of Du Pont's program to teach its rayon workers how to make Dacron.

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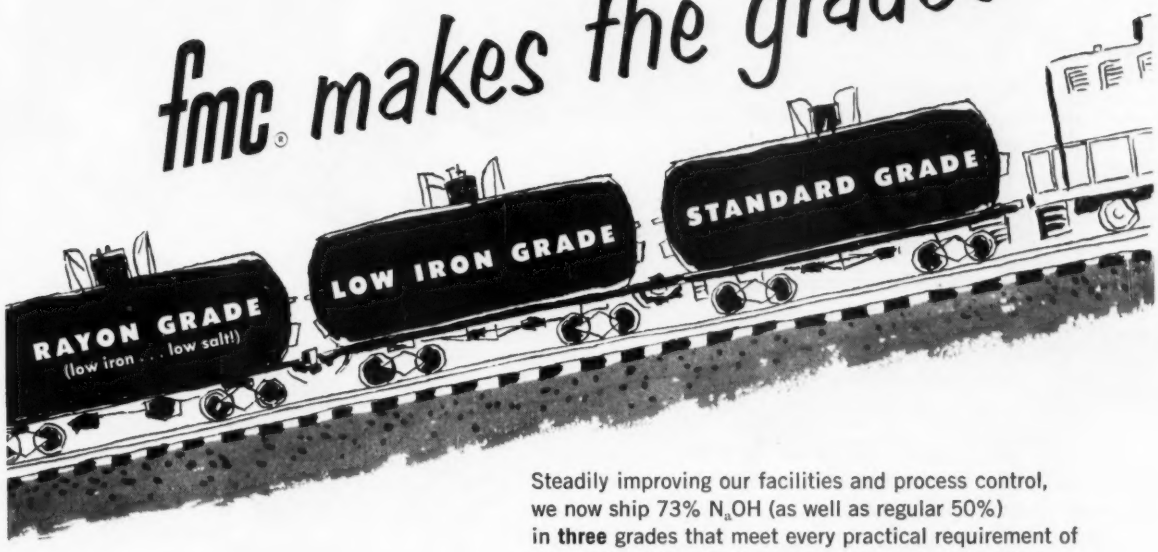

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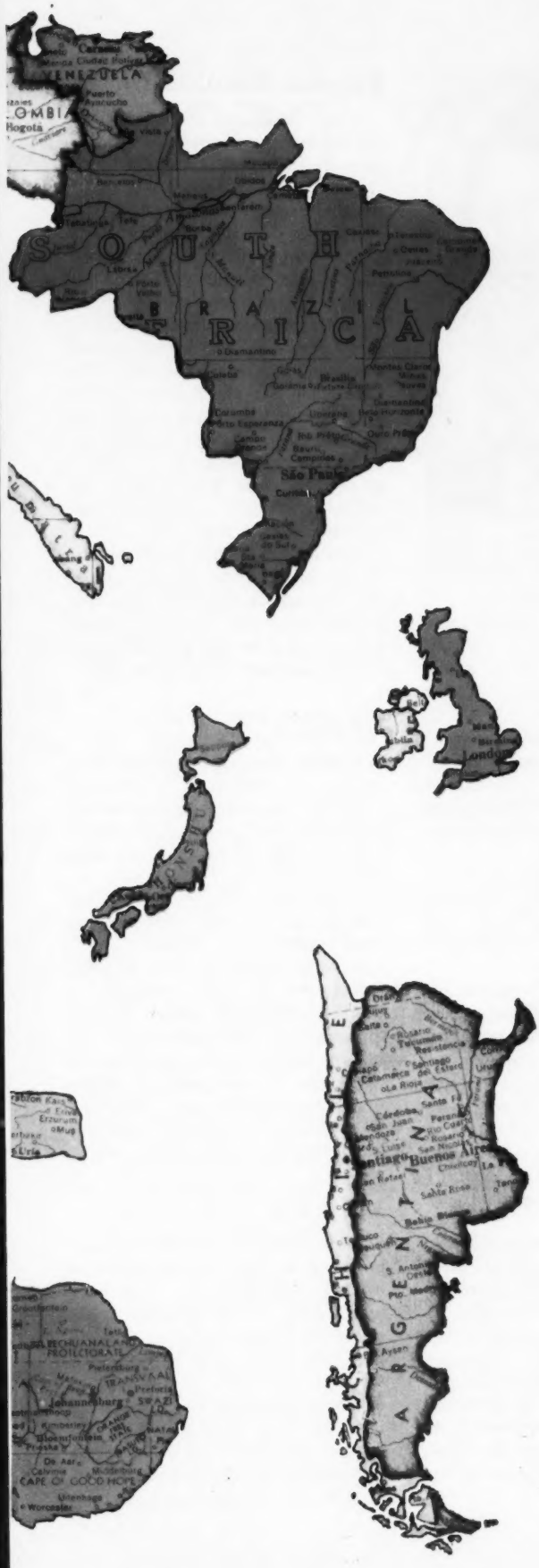

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Efficient process plant engineering requires a thorough familiarity with unit operations gained through a wide variety of chemical process design problems. The engineering experience accumulated by Chemico over almost half a century of service to major chemical, petroleum and petro-chemical companies all over the world, forms part of the background which Chemico engineers have developed for undertaking the most complex and extensive projects from the "grass roots" stage through start-up and production.

If you are interested in learning more about Chemico, write to "Department C".

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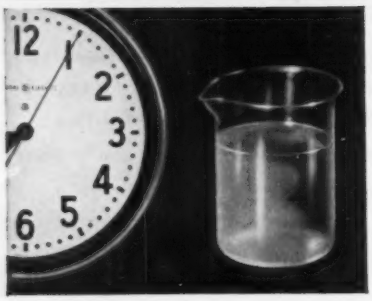

Faster Dispersions: Low-viscosity G-E Antifoam 60 disperses instantly, can easily be poured. You'll find it more convenient to use and faster-acting than other silicone defoamers.

Higher Concentration: General Electric Antifoam 60 comes to you in concentrated form (30% silicones) for easier handling and storage. You can use it as supplied, or reduce it with water to any desired concentration.

Greater Economy: Only a few parts per million are needed in most foaming systems, even less than with other silicone antifoams. And because such minute quantities are used, G-E Antifoam 60 will not affect the other properties of your process.

●

Write for a free test sample, specifying whether yours is an aqueous or non-aqueous system. Section EE 932, Silicone Products Dept., Waterford, N. Y.

GENERAL ELECTRIC

Michigan U.'s Odiorne: A tax break might promote private retraining.

conditions and prepares him for more opportunities.

• Encourage employees to attend trade shows, keep informed in other ways about competition.

• If appeal to the employees against initial labor opposition is necessary, be careful to avoid unfair labor practices or antagonizing the unions, which makes future cooperation difficult.

Federal Aim: Those six points can minimize an individual company's headaches; on a national scale, some broader sort of action will probably be needed.

Whether H.R. 8399, which would authorize a $300-million outlay over a two-year period for the retraining of the unemployed, is the best approach is hard to say. The House Rules Committeee has reached an informal agreement to put off action on the bill until next year. One reason for the delay: arguments that industry is already doing a great deal of such training on its own.

However, the continuing existence of automation-induced unemployment —even in the currently improving economy—could change Congress' attitude next year. Since entire industries, as well as individual plants, are vulnerable to technological changes, the retraining tab may be more than industry can handle. Meanwhile, in the CPI at least, companies are showing that they can and will look out for their own.

Process Simulator

A new device for use in industrial process-control training programs has been developed by Carmody Corp. (Buffalo, N.Y.). It folds into a 350-lb. portable package, can reportedly duplicate almost any process-control board. Two panels, one for flannel board-type placements of a schematic diagram of the process system and the other for actual installment of instruments, simulate the actual control board of the plant operation. The functioning instruments are controlled by an instructor from a master control board and varying conditions can be introduced to simulate the dynamics of the process. The trainee at the control board must then take the appropriate control steps.

Because the control board can be readily changed to simulate other process controls, companies operating a large and varied number of facilities are said to be able to expand their training activities at moderate cost.

LEGAL

Refinery Block: Suit has been filed in Delaware state court of chancery to block construction of a proposed $80-million Shell Oil refinery in Blackbird Hundred section of New Castle County, Delaware. The suit seeks injunction against Shell and calls for voiding a levy court action in rezoning 2,625 acres for the refinery.

A petition that was filed by John Dukes and nine other residents of Blackbird Hundred section declares that erection and operation of the refinery would create a nuisance by "discharge of foul, noisome odors, smoke and harmful gases," rob land of its "aesthetic qualities," and thus cause its value to depreciate.

LABOR

Job-Sharing: A job-sharing plan presented to 1,600 union employees by Parke, Davis & Co. has been turned down. A poll by Local 11-176 of the Oil, Chemical & Atomic Workers Union showed that only 15% of the men and 21% of the women members supported the plan. Carl Labatsky, local union president, said he was particularly surprised at the response by the men—"because most of them are breadwinners and some-

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Nowhere else can you target your sales message more accurately to the *"traditionally management"* audience who will attend the Exposition. And don't forget, you receive big plus values to further merchandise your products and exhibit in the Official CW-CE Directory. No ad space carried but extra attention is assured by bold-faced listing for advertisers in the November 18th issue.

Why wait? Call your CW representative today for all the details . . . and make an early reservation in the *"Industry Spokesman for CPI Management." Closing date* for the "Chem Show Report" is *October 28th.* Regular rates apply.

*to pre-sell more buyers at the Chem Show?

day may face layoffs themselves."

The questionnaire asked workers if they would be willing to give up two workdays each month to provide jobs for other members either laid off or facing layoff. It was circulated with company cooperation by union representatives as a followup to a similar plan now in effect in several divisions at Parke, Davis' main plant in Detroit. The original plan, begun in July and due to expire Sept. 15, involved about 450 women employees who volunteered to take time off to give laid-off workers employment. The new plan would have meant continued jobs and rehiring for about 50 women and from five to 20 men.

Harold K. Daniels, company vice-president in charge of personnel, who worked with Labatsky on the original plan, said he was "disappointed" at the poor show of support.

KEY CHANGES

Fred W. Elliott to executive vice-president, Michigan Chemical Corp. (St. Louis, Mich.).

Kurt P. Duldner, Thomas I. Sheridan, Henry W. Parke to the board of directors, Cosden Petrochemical Corp. (New York).

Arthur Minich to president, Heyden Chemical Division, Heyden Newport Chemical Corp. (New York).

Gordon Rozand to director of manufacturing, Cary Chemicals, Inc. (East Brunswick, N.J.).

Joseph Shore to chairman of the board of directors, **Hobart C. Jete** to president, **Edmund G. Thomas** to the board of directors, A. J. Parker Co. (Philadelphia), pharmaceutical chemicals firm.

Joseph J. Daniels to the board of directors, National Distillers and Chemical Corp. (New York).

Earle B. Barnes to assistant secretary, Dow Chemical Co. (Midland, Mich.).

H. J. Bolwell to vice-president, Midland-Ross Corp. (Cleveland).

Leonard W. Mawhinney to vice-president, **R. A. Bernabo** to corporate secretary, **E. J. Robesch** to assistant controller and assistant secretary, Metal & Thermit Corp. (New York).

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"Buffalo"
AIR
AND
LIQUID
HANDLING EQUIPMENT
FOR THE CHEMICAL INDUSTRY

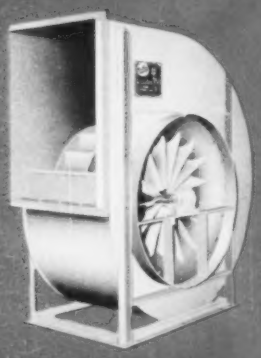
AIR HANDLING EQUIPMENT

BL fans-standard duty

Available in Class I and II construction, 'Buffalo' BL fans, with exclusive die-formed backwardly curved blades, are quiet and highly efficient with stable performance over full capacity range in ventilating and air conditioning service.

Class I fans are designed for operation against maximum pressure of 3¾" water gauge when handling sea-level air at 70° F. Anti-friction bearings, and slip joint inlets and outlets are standard. Sleeve bearings and flanged outlets are optionally available.

Class II fans are designed for operation against a maximum 6¾" water gauge total pressure when handling sea-level air at 70° F. Slip joint inlet, flanged outlet, and anti-friction bearings are standard.



Special features and accessories available include corrosion-resistant paint, plastic coating, rubber covering and special metals as well as high temperature and spark resistant construction.

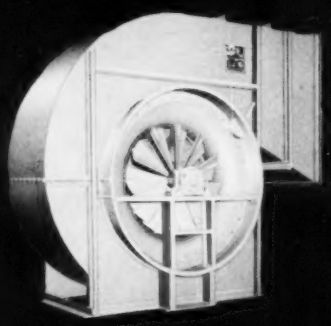
'Buffalo' BL fans can be furnished in all discharge arrangements and for all types of drive. Performance ratings conform with the test code of the American Society of Heating and Ventilating Engineers and The Air Moving and Conditioning Association, Inc. **(Request Bulletin F104)**

BLH fans-heavy duty

Available in Class III and IV construction, 'Buffalo' BLH fans are designed for heavy-duty air moving in air conditioning and industrial applications. BLH fans with gradually divergent outlet give a more equal pressure distribution, have a higher static conversion, and reduce turbulence to a minimum. Non-overloading, backwardly curved blades are highly efficient and are noted for exceptionally stable operation over the entire range of delivery.

Class III fans are designed for operation against a maximum of 12¼" water gauge total pressure when handling sea-level air at 70° F.

Class IV fans are designed for operation above 12¼" water gauge total pressure.



In both classes, anti-friction bearings and fixed inlet vanes are furnished as standard. Variable inlet vanes are optionally available. **(Request Bulletin F201)**

belted vent sets

(50 through 19,620 cfm at ½" S.P.)

'Buffalo' Belted Vent Sets are "packaged" units ready for immediate installation wherever ventilating applications call for an extremely quiet fan characterized by high efficiency and low initial and operating costs. These fans have a "Limit Load" wheel with patented, double-curved blades. Stationary inlet vanes reduce turbulence and air noise by minimizing entering air shock loss and insure stable fan operation under unfavorable inlet conditions.

Adjustable pitch motor sheaves are furnished on all motor ratings, providing quick, easy adjustment after fan installation. Duct work can be altered after the fan has been installed and all units are adjustable to any 45° angle of discharge. **Also available with corrosion-resistant materials or coating. (Request Bulletin 3720)**

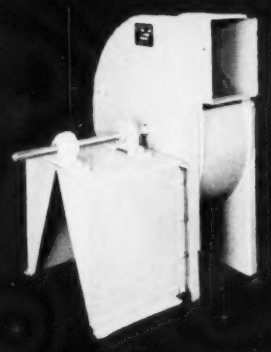
Portable "Baby" Vent Sets (85 through 1765 cfm), designed for either blowing or exhausting, are adaptable to a variety of application. **(Request Bulletin FMB-135)**

industrial exhausters

Buffalo's rugged, heavy-duty line of Industrial Exhausters is designed for the high efficiency handling of materials and air to temperatures as high as 850° F.

TYPE AW — (615 through 37,800 cfm and up to 20" S.P.)
for exhausing hot air, fumes, and gases. No spider to interfere with air flow. Rugged back plate shields bearings from heat. Eight curved blades.

TYPE MW — (300 through 85,200 cfm and up to 20" S.P.)
for handling clean air and practically any non-stringy material such as emery dust, sawdust, chips or other material normally transportable by a pneumatic conveying system. Models available with acid-resisting paint, corrosion-resistant plastic, or of Everdur, stainless, Monel, or Inconel construction. Six radial blades.



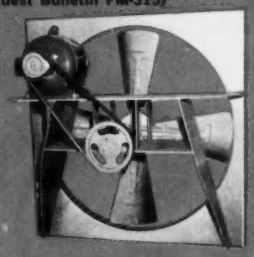
TYPE OW — (300 through 85,200 cfm and up to 20" S.P.)
for handling stringy material such as long shavings, paper trim and textile fibers. Six radial blades and back plate. No front plate.
Heavy, all-welded steel plate housings have removable front and back plates of such diameter that rotor can be easily removed through the side of the fan.
All models available in arrangements 1, 9, 10, 4, and 8. Several motor frame sizes may be used with each fan size to meet specific air volume and pressure requirements.

package propeller fans (5000 through 250,000 cfm and up to 1½" S. P.)

'Buffalo' "Package" Propeller fans, completely assembled, ready for low-cost field installation and immediate operation, are available in two designs.

DESIGN 53 BELT-AIR FANS are built to move large volumes of air. Installation and original equipment costs are low. High fan efficiency and rugged construction assure lowest possible operating and maintenance costs. Sizes 24" through 120" are available and may be furnished in special materials of construction for corrosive-and/or explosion-proof applications.

The following accessories are available in sizes to fit all models: wire guards for fan or motor side; gravity-type, automatic, manual, or motor-operated shutters. Penthouses available for sizes 24" through 54". **(Request Bulletin FM-315)**



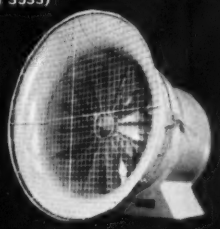
DESIGN 50, 65 AND 80 TYPE NV FANS for heavy duty applications best served by a "package" type Belt-Air fan. Motors for direct or adjustable pitch V-belt drive are included. A wide range of motor sizes, and any type NEMA motor frame enclosure can be provided for each size. Non-sparking aluminum construction can be furnished for applications requiring explosion-proof features. Shafts and bearings are heavy-duty type. **(Request Bulletin)**

vaneaxial and tubeaxial fans

(2000 cfm through 175,000 and up to 3" S. P.)

'Buffalo' Vaneaxial and Tubeaxial fans, widely used for booster fans, roof ventilators, and hood and vat exhaust are of lightweight, compact design. Ideal for space-saving installation in ductwork systems, they require little more space than the diameter of the duct itself. Of high efficiency design, they are extremely effective for static pressures ranging from ¼" to 3".

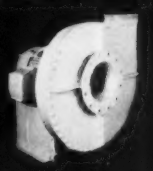
Uniform air flow permits operating speeds much slower than those required by ordinary propeller fans. Direct drive as well as belt-driven fans use standard motors. Available in sizes up to 96", vaneaxial and tubeaxial fans are furnished in arrangement 9 for belt-drive . . . arrangement 4 for direct drive. Discharge may be up, down, or horizontal. Tubeaxial fans (without vanes) are direct connected. **(Request Bulletin 3533)**



pressure blower type CB

(135 through 37,500 cfm and up to 74" water gauge) as standard and fans for higher capacities and pressure are engineered to special conditions)

Designed for high pressure, moderate volume duty in the chemical, steel, glass, textile, and food process industries. Balanced, overhung rotors; flanged inlets and outlets; removable side plates; and heavy welded steel plate construction are combined to assure economical, maintenance-free operation for extended periods of severe service. Air and gas tight construction is furnished when required. **(Request Bulletin FI-310)**



AIR HANDLING EQUIPMENT

sky-vent® power roof ventilators

(1000 through 250,000 cfm and up to 1" S. P.)

'Buffalo' Sky-Vent® Ventilators provide maximum fresh air circulation at lowest cost. Designed for "package" installation and immediate operation, they can be made to exhaust waste air, or supply fresh air efficiently . . . in volume . . . **without ductwork of any kind!**

Where extremely large amounts of air must be exchanged continuously, the tremendous air moving capacity of 'Buffalo' Power Roof Ventilators means that fewer units . . . fewer roof openings are required . . . equipment and installation costs are held to a minimum.

Available in 12" through 108" wheels, 'Buffalo' Sky-Vents® ventilate entire plants (or sections of plants), with no interference to lighting, overhead handling systems, or production line layout.

Rugged 'Buffalo' construction features tubular-braced hoods and stacks capable of withstanding the heaviest snow loads and winds of hurricane force. All units are supplied with corrosion-resistant coating. **(Request Bulletin)**

make-up air heater section (up to 100,000 cfm)

A specially engineered, high capacity heating and/or ventilating unit, often used with 'Buffalo' Style 'H' Sky-Vents®. They require no ductwork . . . attach to ceiling or wall . . . are available in any combination of fresh and return air dampers, face and by-pass dampers, filters, non-freeze heating coils, or reverse design wheels for summer exhaust. Modified designs also available, utilizing direct gas-fired burners with 25 to 1 turndown ratio where steam or hot water is not available. **(Request Bulletin 2345)**

air cooled condensers

(7½- to over 100-ton capacities)

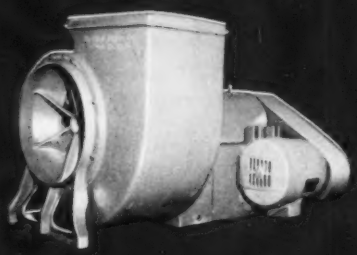
The most efficient, trouble-free condensers in the liquid coolant field. Air cooling principle eliminates all problems of winter freezing, high-cost water, contaminated water, unreliable water supply, high sewer taxes, and poor drainage.

Available as easily-installed, factory-assembled "packages," they feature low silhouettes, vertical discharge, by-pass damper head pressure control. Vertical air discharge is unaffected by wind velocity. Opposed blade by-pass dampers control temperatures far more effectively than parallel blade dampers or "flooded" coil control. Heavy gauge galvanized steel casings save weight . . . assure years of service. Furnished in 11 capacities ranging from 7½ to more than 100 tons (at 120° F. condensing temperature, 40° F. suction, and 100° F. ambient). **(Request Bulletin F-4095)**

cast iron-type LL

(1200 to 7000 cfm at ¼" S. P.)

Developed for high efficiency removal of extremely corrosive fumes, 'Buffalo' Cast Iron Type LL fans have found wide acceptance in the chemical and process industries. Rugged cast iron housings, and inlet cones with integrally cast vanes, are responsible for low-turbulence air flow and high mechanical efficiency. Standard Monel wheels are equipped with non-overloading backwardly curved blades. Stainless steel, protective coated steel, Everdur, or aluminum wheels are also available.



These fans can be furnished with direct motor drive, separate belt drive, or as a "packaged" unit with adjustable pitch V-belt drive and motor mounted on adjustable base rails. Full weather protection includes enclosed motor, belt guard, and a rain shield for ball bearings and shaft drive. **(Request Bulletin 3771)**

AIR AND GAS CLEANING EQUIPMENT

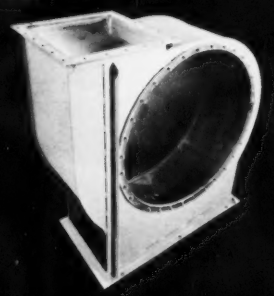
RESISTANT FANS

rubber-lined fans

(600 to 200,000 cfm)

Proved in thousands of installations over a period of more than 30 years, actual records show that 'Buffalo' Rubber-Lined fans have up to 12 times the life expectancy of ordinary metal fans exposed to severely corrosive fumes. Economies effected by the reduction of downtime are equally impressive.

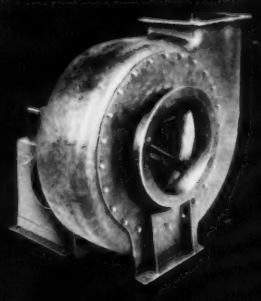
Through a special process, rotors, shafts, and the inside of housings are completely rubber protected . . . rubber lining is actually "welded" into the metal pores . . . corrosive fumes never encounter the metal surfaces.



resin-bonded fiber glass fans

(to 34,000 cfm and up to 10" S. P.)

'Buffalo' Fiber Glass fans show remarkable resistance to a wide range of acids, salts, gases, organic materials, and other corrosives. Designed for temperatures to 225° F. and higher, the materials used on 'Buffalo' FG fans have high impact strength . . . will not support combustion. All metal surfaces normally exposed to the air stream are protected by a thick coating of fiber glass. Accessories include clean-out doors, access doors, and drains.



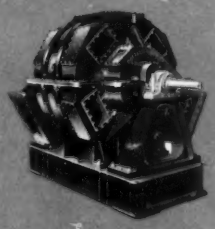
hydraulic scrubbing towers

(Capacities through 60,000 cfm)

Employing a finely atomized spray system for particle conditioning and inertial separation of the contaminant from the gas stream, this unit is highly efficient in handling fumes and gases as well as sticky, corrosive, or abrasive dusts. Low maintenance design eliminates internal impingement plates, packing and moving parts. When required, unit can be serviced during operation. Special corrosion-resistant linings, coatings or special material of construction are available at minimum cost. Inlet gas temperatures as high as 1200° F. can be handled. **(Request Bulletin AP-525-A)**

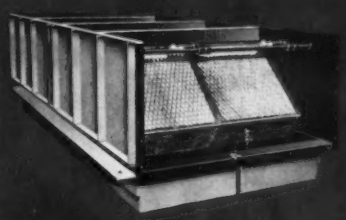
rotary multi-stage scrubbers (2,000 cfm)

Extremely successful for removing tar vapor, lampblack and metallic fumes generated by electric furnace and electro-metallurgical processes. In unusual circumstances where low initial loadings of toxic fumes are encountered, this disintegrator type scrubber guarantees exceptionally high contaminant removal in minimum space. To produce a high degree of scrubbing action, a special two-element fan is used in conjunction with multiple spray nozzles. **(Request Bulletin AP-425)**



gas absorbers

'Buffalo' Gas Absorbers are designed for scrubbing air or process gas streams to remove soluble gases, mists, and vapors, as well as insoluble particles. They are extremely effective in product recovery and the elimination of air polluting materials. Single and multi-stage gas absorption models with wetted fiber cells can be furnished with a wetted impingement stage and a dry mist-eliminator. Each unit is fabricated to assure maximum efficiency in a specific application. **(Request Bulletin AP-2500)**



air washers

(1850 through 112,500 cfm)

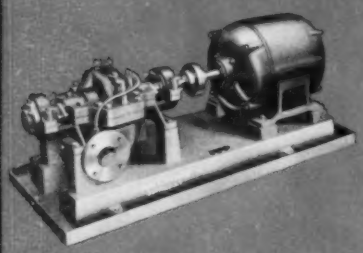
A complete line of 'Buffalo' Air Washers is available to meet a variety of air cleaning requirements. Spray, surface cooling, heating, or filter cleaning features are offered in the necessary combinations to handle the most exacting air washing and processing requirements. Economical to install and operate, 'Buffalo' Air Washers are built for long-life service with minimum maintenance.

LIQUID HANDLING EQUIPMENT

single suction multi-stage pumps

(20 through 900 gpm. Heads up to 1500')

Available in 2 and 4-stage models, 'Buffalo' Multi-Stage Pumps are designed for hot or cold clear water handling. They stand up under continuous service . . . require little maintenance or repair. Hydraulic balance contributes to high efficiency and lower power costs. Standard construction includes semi-steel casings, bronze impellers, and solid bronze diaphragms with renewable bronze liners. Interior parts can be inspected or removed without breaking pipe connections. Motor sizes range from 1½ to 300 hp. **(Request Bulletin 980)**

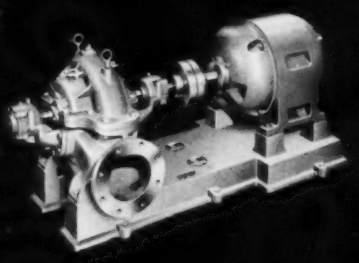


double suction pumps

(20 through 14,000 gpm. Heads up to 400')

'Buffalo' Double Suction Single Stage Pumps are recommended for practically every clear water service. Available in horizontal or vertical models they can be connected directly to motors, steam turbines, gasoline engines, or furnished for pulley drive. Divided casing permits inspection of impeller without disconnecting the piping . . . impellers remain in hydraulic balance.

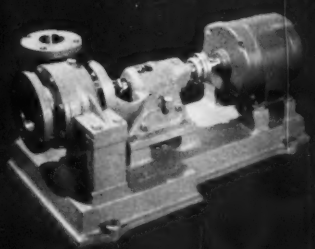
A series of this pump line is fully approved by the National Board of Fire Underwriters. **(Request Bulletin 955)**



high temperature single suction pumps

(5 through 1100 gpm. Heads up to 360')

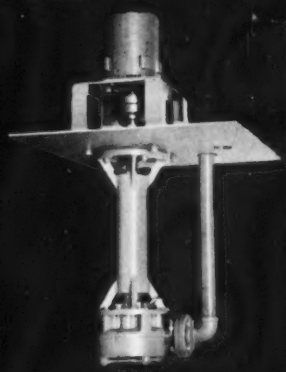
Equipped to handle high temperature liquids up to 750° F., these 'Buffalo' pumps feature water-cooled bearings and stuffing boxes, cast steel casings and side plates, smothering gland, colmonoy-coated shaft sleeve, and flexible all-steel coupling. Mechanical seals are optionally available.



submerged process pumps

(5 through 1100 gpm. Heads up to 150')

Furnished in all materials of construction, 'Buffalo' Submerged Process Pumps are ideal for handling corrosive and non-corrosive liquids and slurries. Of vertical design, they may be used submerged or non-submerged. Models with optionally available steam jacketing handle up to 850° F. liquids.

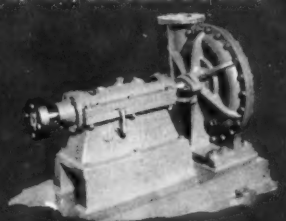


CORROSION RESISTANT PUMPS

'Buffalo' manufactures one of the most complete lines of corrosion-resistant pumps in the industry. The line includes lead acid pumps, rubber-lined pumps, and a long list of alloy construction pumps.

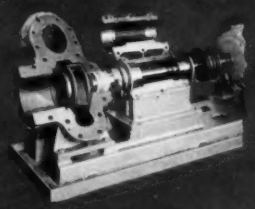
lead acid pumps

(10 through 160 gpm. Heads up to 120')
with enclosed impellers and full ball or sleeve bearings, successfully handle hot and cold sulphuric acid of all strengths, plus sulphurous acid, alum, ammonium sulphate, and copper sulphate. All parts exposed to the liquid are made of lead. Bronze bolts, nuts, and studs are used.



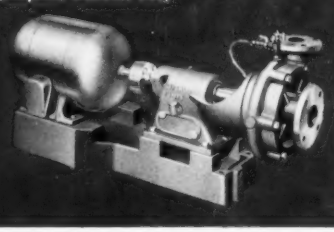
rubber-lined pumps

(Up to 10,000 gpm. Heads up to 300')
are also ideal for acids and corrosive chemicals. No metal parts contact the fluid being pumped. Fluid temperatures are limited only by the fluid concentration, and type of rubber used.



alloy pumps

(5 through 1100 gpm. Heads up to 360')
are available in the following materials: stainless steel, Monel, acid-resisting bronze, ni-resist, Hastelloy B & C, and manganese steel. Only tough, non-brittle alloys are used.
(Request Bulletin 982)

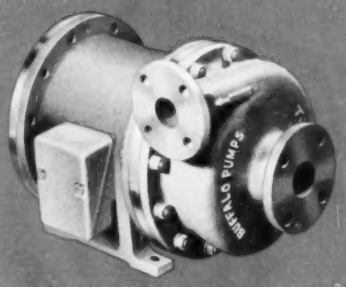


Can-O-Matic leakproof pumps

(13 sizes — 1" through 5" discharges)

Designed for the chemical, petrochemical, atomic energy, and marine industries, 'Buffalo' Can-O-Matics are the most practical, durable, and easily maintained pumps in the hermetic field. Totally enclosed, they are so simple in design they can be taken apart and reassembled with open-end wrenches and a screwdriver.

Long-life bearings are a great new advance in hermetic pump design. Lubricated by the liquid being pumped, they absorb both radial and axial thrusts . . . automatically compensate for bearing and journal wear. Toxic or volatile liquids cannot escape . . . air cannot leak in.



Standard units with stainless steel stator can are designed for 120 psig and 40° through 250°F. applications. Special models can be furnished for higher pressures and temperatures, and a variety of dangerous, corrosive liquids.

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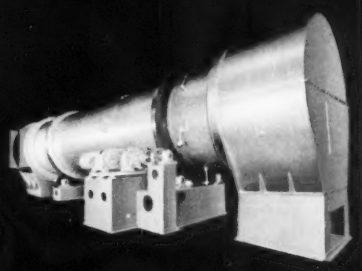

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Rhinoceros herd is target for Palmer's sleep-shooting Cap-Chur gun.

Insensible rhino can be moved without struggle to new location.

Closeup of small syringe used by gas-powered Cap-Chur projector.

Drug-Shooter Takes Aim at New Targets

This week Harold C. Palmer, president of Palmer Chemical & Equipment Co. (Atlanta, Ga.), began an African trek that will take him to Ethiopia (to help curb a rabies outbreak among dogs), Bechuanaland (to study the effects of drugs on animals) and Ghana (to do some zoological collecting). On these missions Palmer will rely heavily on what looks like a gun but is really a projector for shooting a drug-filled syringe into the animals he hopes to capture.

Palmer manufactures both the gun-like device (called Cap-Chur) and the anesthetizing drugs that the gun fires.

The 47-year-old company president (*see picture, p. 60*) claims to have immobilized and captured more animals with his drug-shooter than any other individual using any other method. Valuable as its contribution to wildlife management may be, the most important area of the company's future activities may be in products designed for human beings, not animals. Palmer thinks that some of the drugs that have been developed to immobilize animals may have some applications in the sphere of human medicine.

Anesthetic Armory: There are two models of the gun that Palmer uses—a 50-caliber rifle (accurate up to 50 yds.) and a pistol (for use up to 20 yds.). The propellant, carbon dioxide, is stored in liquid form in cartridges.

Once the automatic syringe has been fired from the gun, inertia of flight delays drug delivery until contact with the animal. Upon contact, an expulsive device in the syringe forces a rubber plunger forward, emptying the drug chamber.

The expellant may be one of two types: Cap-Chur-Tab is an alkaline pellet (made by Palmer) that, on impact, mixes with a special Cap-Chur-Tab Solution to form carbon dioxide. The gas thrusts the rubber plunger forward, ejecting the drug. This is the slower of the two methods, requires from 1 to 15 seconds for injection.

depending upon the amount of drug to be administered. It's used for subcutaneous injections and for underwater (speargun) shots. Cap-Chur-Charge is a cylinder of explosive powder, set off by a firing pin. This quicker method will inject up to 10 cc. in a fraction of a second.

Syringe sizes range from 1 27/32 to 5 7/32 in. in length; all are ½ in. in diameter. Drug chamber capacities vary from 1 to 10 cc. Length of the needle is determined by the type of injection to be given and by the size of the animal. In the case of an intramuscular injection, a large brown bear or a fat hog would require a needle 2-2½ in. long, while a calf or yearling would require a needle only 1⅛-1¼ in. long. Subcutaneous needles are, of course, shorter.

Ammo: Just as important as equipment in the over-all Cap-Chur technique are the drugs used. Although muscle relaxants have been a part of human medicine for about 20 years, they have been used on animals for only the last decade. Two of the more widely and successfully used immobilizers (so far as animals are concerned) are succinylcholine chloride and gallamine triethiodide. Palmer has found these drugs highly satisfactory for use with his Cap-Chur method under certain conditions. However, he has developed three other drugs: Cap-Chur-Sol; Cap-Chur-Barb and Cap-Chur-Gem.

- Cap-Chur-Sol, like succinylcholine chloride and gallamine triethiodide, is a muscle relaxant. It is nicotine refined to 98%-pure alkaloids, virtually all sulfate (highly toxic) having been removed. Palmer is the only source of a commercially marketed nicotine alkaloid suitable for use in Cap-Chur equipment.
- Cap-Chur-Barb, a barbiturate compound, is administered intramuscularly rather than intravenously.
- Cap-Chur-Gem is the same barbiturate compound as Cap-Chur-Barb except for the addition of nicotine alkaloids, which provide quicker immobilization.

Although Cap-Chur-Barb cannot yet be offered for use in veterinary surgery, Palmer expects to get clearance by the Food & Drug Administration within the next 12 to 18 months. He says that 2,000 tests of the drug show that it has a safety margin about four times that of any other anesthetic now marketed.

Palmer also has great hopes for the use of the Cap-Chur-Barb formula in human medicine, because of the higher safety factor as well as its ease of injection.

Deer Debut: Palmer took over the promotion and development of the Cap-Chur technique in '57. He got into the business when Dr. Seldon Fourt, dean of the College of Pharmacy, University of Tennessee, told him of work that he and others had done—in the course of some deer relocating projects—in developing an anesthetic-laden dart technique for capturing wild animals alive. Fourt was then a consultant to deLeon Laboratories Inc., an Atlanta ethical drug firm of which Palmer was president. Fourt, along with Jack A. Crockford, federal aid coordinator of the Georgia Game and Fish Commission, J. H. Jenkins of the University of Georgia's School of Forestry and Dr. Frank A. Hayes of the School of Veterinary Medicine at the University of Georgia, had established (after some unsuccessful work with strychnine) that nicotine could be used successfully to immobilize animals. They lacked funds, however, to develop the idea commercially.

When Palmer heard of their work from Fourt he decided that such a project would give him a chance to get outdoors and do some hunting, which he enjoys.

Palmer organized another company (Palmer Chemical & Equipment Co.) to provide funds and to handle the gun-and-dart business. He then applied his engineering abilities to the problems of perfecting the gun (greater range and more accuracy were needed). At the same time, he concluded that—if the equipment were to be made marketable—some method would have to be devised for controlling the amount of nicotine injected. (At that point, it was rubbed onto the darts.)

A syringe had to be designed that would hold back ejection until contact with the animal, then discharge its full load. Within a year, Palmer Chemical & Equipment had developed both a workable syringe and a highly accurate gun. After the equipment proved satisfactory with nicotine alkaloids (Cap-Chur-Sol), Palmer brought out Cap-Chur-Barb in '59 and Cap-Chur-Gem in '60.

Palmer examines pistol-type projector used for short-range targets.

The long-range projector sells for $147.75; the short-range gun $104.25. The aluminum syringes are priced from $4.80 to $7.20. Palmer figures that the average cost of firing a syringe into an animal (exclusive of original equipment cost) is 5-15¢, including the cost of the propellant and expulsive devices. Palmer says he has fired as many as 125 shots from one syringe.

Most of the actual manufacturing of equipment is farmed out, but the drugs bearing the Cap-Chur label are compounded in Palmer's lab (a joint facility of Palmer Chemical & Equipment and deLeon Laboratories). In addition to Palmer and one engineer, Palmer Chemical & Equipment's personnel consists of nine production and clerical workers. The four coinventors (Crockford, Jenkins, Hayes and Fourt) are retained as consultants by Palmer and receive royalties.

Palmer declines to give any figures on sales, except to say he has sold thousands of guns in 62 countries. Cap-Chur-Sol ranks first in volume of sales, with Cap-Chur-Gem and Cap-Chur-Barb following in that order. The company also sells (for use in Cap-Chur equipment) cortisone, penicillin and tranquilizers made by other companies.

Varied Uses: Future applications

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that Palmer and his associates see for Cap-Chur include use as a possible defense against plane hijackers; the injecting of pain-relieving drugs into persons injured or trapped in inaccessible spots; and could conceivably quiet mobs or halt prison riots. Although little work has been done on the in-water uses of the equipment, Palmer believes this also is a fertile field, especially in the handling and capture of whales. For instance, he says, "A killer whale has never been displayed alive. There is no doubt in my mind that our technique can make this possible."

But Cap-Chur-Barb has the most exciting potential, in Palmer's opinion. He is confident that this anesthetic will be a boon to human as well as veterinary medicine. According to Palmer, an anesthetic that could be successfully administered through the intramuscular route would have several advantages over the present intravenously injected drugs. He believes his anesthetic fills the bill.

One thing appears certain: Palmer and his co-workers have introduced a concept of immobilization for which new applications will be popping up for a long time to come.

Coating for Bricks

Garnak Chemical Co., Ltd. (Port Hope, Can.), has developed a new brick coating that is said to duplicate the outdoor performance of glass-glazed bricks but costs only about half as much. The finish is applied during the manufacture of clay bricks at the brick factory. Glazed bricks in 48 different colors can be produced.

Garnak calls the process Polydite, plans to license it in Canada, the U.S., and abroad. At least six Canadian brick manufacturers are expected to license the material soon. One Ontario brickmaker reportedly has signed a five-year, $100,000 contract with Garnak for the material.

Fred Johnson, president of the firm, won't identify the composition of the material. But since Garnak (established two years ago) has done considerable work with epoxidized coatings (including cross-linked nylon, Hypalon, pine oil) one guess is that formation of the new coating is a hybrid utilizing some of those materials.

PRODUCTS

Germicide-Bactericides: Kemitrol Co. (650 South Ave., Garwood, N.J.) is now offering a series of new compounds combining fungicidal, germicidal and bactericidal properties for use in plastic film, molded and extruded plastics, organic solution and dispersions. They reportedly will not impart or alter color, are free of lead, mercury, arsenic, chlorine and other halogens, are noncorrosive to metals. Potency against *Staphylococcus aureus* and low oral toxicity (LD 50-147/-mg./kg. suggest use in santizers, surface sprays, floor waxes.

•

Insulating Varnishes: Ram Chemicals (210 East Alondra Blvd., Gardena, Calif.) is marketing electrical insulating varnishes based on diallyl phthalate and diallyl isophthalate resins. They're tradenamed Ram 23-X4 and 23-X5, are suggested for coating, sealing, or dip encapsulating of capacitors, resistors, motor windings, transistors and diodes. The X4 formulation is designed to function at continuous temperatures of 150 C, the X5 for operating temperatures of 180 C.

•

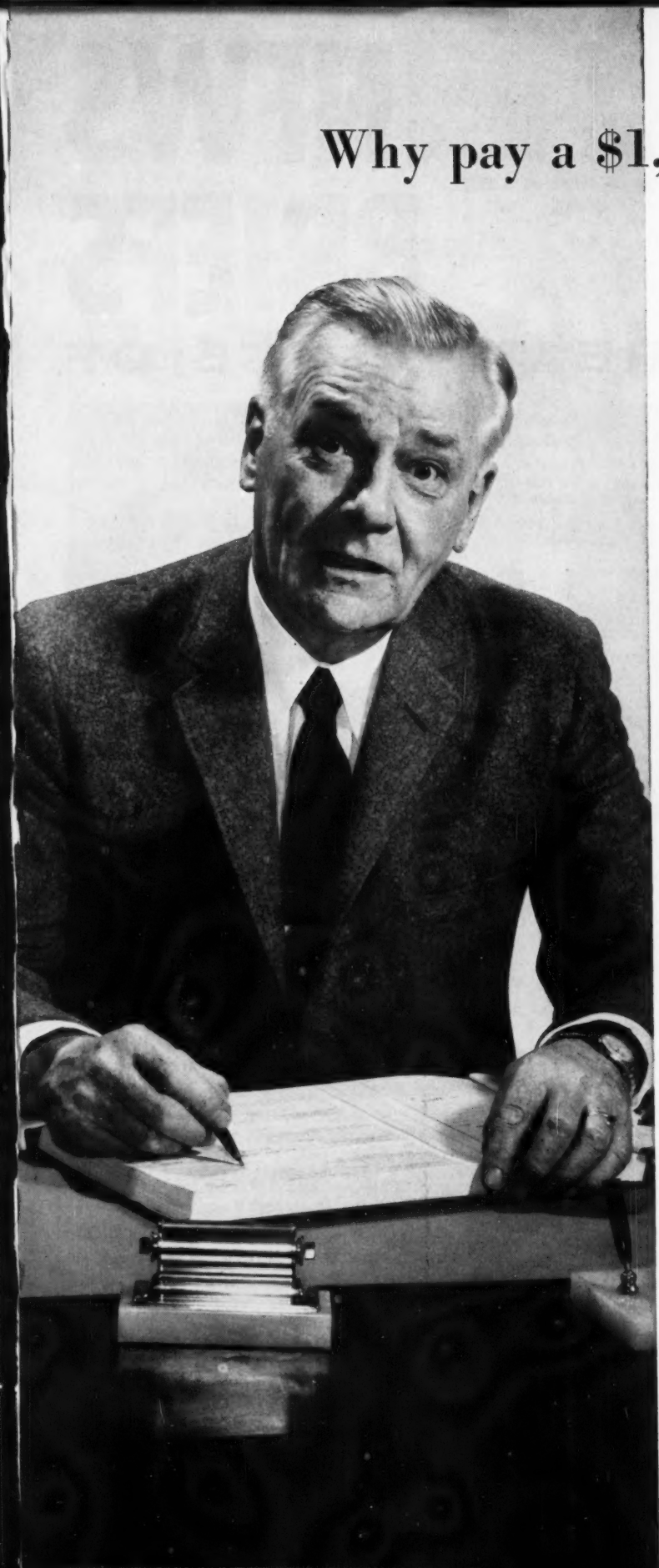
Plasticizers: Two new plasticizers for polyvinyl chloride, Monoplex DIOA and Monoplex DDA, are being offered by Rohm & Haas. Of these adipate esters, DIOA (diisooctyl adipate) has somewhat better compatibility with PVC, while Monoplex DDA (diisodecyl adipate) has lower volatility and improved resistance to aqueous extraction.

•

Solvent Purifiers: A new product for purifying solvents used in coin-operated drycleaning machines, Darco Coin-Op Blend, is being offered by Atlas Chemical Industries (Wilmington, Del.). It's a mixture of activated carbon and filter powder, eliminates need for mixing carbon. It's being marketed in 2-lb. bags.

•

Flame-Retardant Resin: Isochem Resins Co. (221 Oak St., Providence, R.I.) has added a low-viscosity, flame-retardant, 100% epoxy resin system, Isochemrez FR, to its product line. It can be used with most conventional hardeners, but the company has developed special hardeners to eliminate inherent brittleness in the resin.



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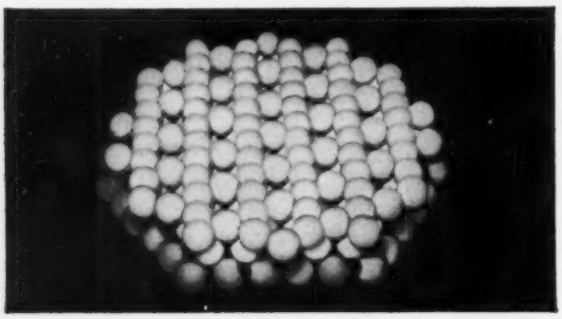

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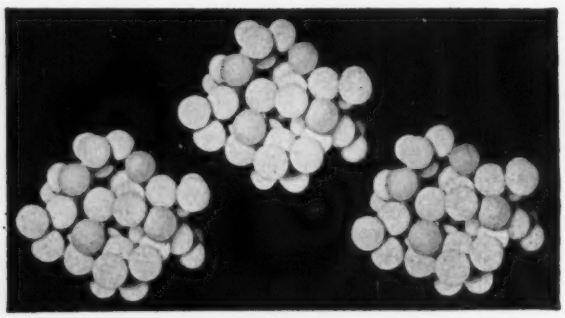

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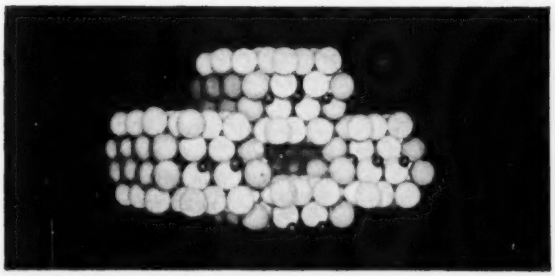

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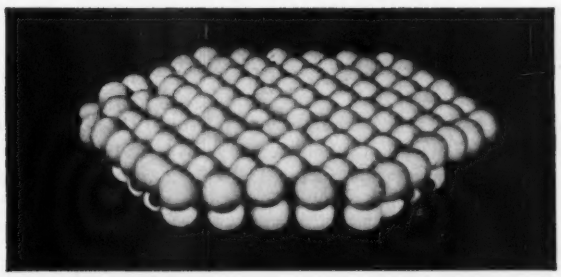

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Metals Maker Bets on By-products

Since '54 the world's largest zinc producer, Société des Mines et Fonderies de la Vieille-Montagne (Angleur, Belgium), has been prying profits from the many by-product minerals in zinc ores. This week, the company moved to raise the ante. It will dismantle a fluidized-bed zinc ore roasting pilot plant at Balen, Belgium, replace it with a 130-tons/day commercial unit.

This expansion highlights the success of Vieille-Montagne's mineral-by-products recovery work. The Balen plant's zinc refining process has been integrated with a lead refining process and a series of operations for recovering other metals. Today, Vieille-Montagne is probably the only company in the world recovering so broad a range of values.

It is one of the world's largest producers of hyperpure germanium for semiconductors. Among its other products: zinc (220,000 tons/year), lead (35,000 tons/year), sulfuric acid (330,000 tons/year), cadmium (820 tons/year), copper sulfate (4,400 tons/year), bismuth (66 tons/year), mercury (10,000 lbs./year).

The lead and zinc ores that provide the raw material for these products are imported (through Antwerp) from mines throughout the world, including U.S. mines. The resultant wide range of profitable products depends solely on the processes by which Vieille-Montagne has tied its zinc-lead production lines together.

Key to this operation is a special fuming furnace that uses air (enriched with oxygen from a Linde process plant), along with coal and coke, to reduce slag left over from smelting lead in the Balen blast furnaces (*see diagram, p. 67*). For years, this slag—although it averages 15% zinc, 2% lead, 0.5% copper—was dumped. Several hundred thousands of tons had accumulated in mounds outside the Balen plant.

Today, however, this dumped slag, along with freshly formed slag from the lead blast furances and sludge from the zinc processing line, is being treated in the fuming furnace to recover all the metals. By combining the sludge and slags at this point:

- The slimy residue from the zinc line is mixed with lumpy ore to give it good consistency for the fuming furnace.
- The efficiency of the lead line is increased, since the zinc-containing slag is no longer dumped as waste.
- The efficiency of the zinc line is improved, since the metal values are recovered from the waste sludge.
- The germanium impurities brought in with the zinc ores are recirculated, with the only outlet being the sludge left from leaching the products recovered from the fuming furnace.

Galena and Sphalerite: The presence of many impurities common to both lead and zinc ores lends scientific sense to this combined processing. Galena, the lead ore, is lead sulfide in combination with zinc, silver, gold and iron minerals, whereas sphalerite, the zinc ore, is zinc sulfide associated with lead, silver, gold, iron, copper, cadmium, mercury and germanium.

Processing either ore normally produces large quantities of residue rich in the other metal. Sludge from the leaching step of the zinc process is rich in lead, while the slag from the lead blast furnaces is rich in zinc. By combining the two processes, and through its carefully worked out sequence, Vieille-Montagne has been able to recover as well by-product minerals from both ores.

Leaching for Electrolysis: This sequence depends on Vieille-Montagne's basic zinc process: electrolysis. There are six standard processes for recovering zinc: (1) horizontal (Belgian) retorts, the original process used by Vieille-Montagne at Liege, (2) vertical retorts, (3) vertical electrothermic furnaces, (4) electrothermic arc furnaces, (5) electrothermic furnacing of lead slag, and (6) electrolysis.

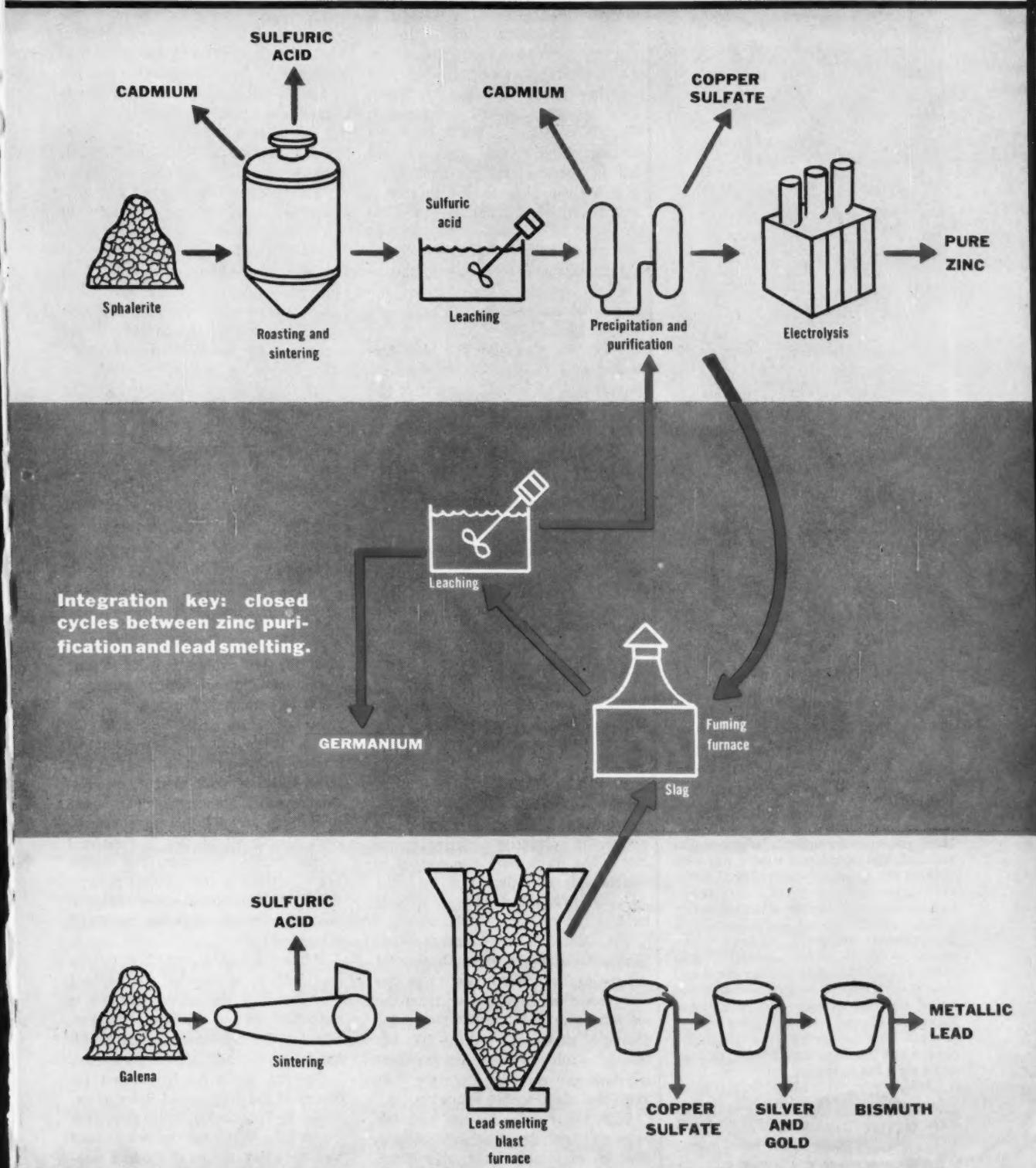
All these processes require that the sphalerite first be roasted and sintered (this is the step at which the new fluidized-bed furnace will be installed). And it is in these roasting and sintering steps that sulfur (some 31% of the sphalerite ore) is recovered for sulfuric acid.

But, whereas in the first five processes sinter can be mixed with coke or coal and fed directly to the reduction step, the electrolysis route requires preliminary processing through leaching and purification. The sinter from the fluidized-bed furnaces is leached by mixing it with dilute sulfuric acid. This takes the zinc into solution as zinc sulfate. And by neutralizing the solution with calcium oxide (lime), impurities such as copper and bismuth are precipitated along with the lead, gold and silver in the sludge.

A very high purity is necessary for economical electrolysis, however, and the clear solution resulting from the leaching operation must be further purified by treating it with zinc dust. This step precipitates cadmium and germanium. The resulting pure zinc sulfate goes on to the electrolysis plant, where the zinc is recovered as 99.995%-pure metal.

Meanwhile, lead and noble metal by-products from the zinc process are sent to the lead line by transferring both the precipitates from the leaching and the purification steps to the fuming furnace. On the other hand, zinc recovered from the lead line enters the zinc process at the purifica-

Vieille-Montagne Blends Lead Slag with Zinc Sludge and Wins By-product Bonanza



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tion step as clear sulfate solution from a leaching unit, which operates on the concentrate recovered from the fuming furnace.

The Lead Line: Galena is also sintered to drive off sulfur for acid production before it is fed to the lead smelting blast furnaces. At Balen, these blast furnaces are recent models with diameters of about 8 ft. at the tuyeres. Mixed coke and coal are fed in for the reduction reactions. The hot air blast to the tuyeres is heavily enriched with oxygen. And the feedstock includes the sintered ore, plus (1) the residues from leaching the fuming furnace concentrate and (2) residues shipped from the horizontal zinc retorts still in operation at Liege.

While the slag from the blast furnaces goes to the fuming furnace, the crude lead is siphoned out of the hearth to a drossing (skimming) kettle, where copper is taken off as copper sulfide. From drossing, the lead bullion goes to a conventional Harris process unit for extraction of arsenic, tin and antimony in the form of salable salts. Following this the lead is desilvered in a conventional Parke process unit; and bismuth, which is not removed by the Parke process, is recovered by adding metallic calcium and magnesium, which bring the bismuth to the surface as slag.

The remaining lead, 99.97 to 99.995% pure, depending on customer specifications, is transferred to a lead rolling mill adjacent to the processing plant.

Cadmium: Originally, almost all of Vieille-Montagne's cadmium was recovered from the dusts carried off above the sphalerite sintering operations. The dusts were precipitated in Cottrell electrostatic units, then the cadmium was dissolved with sulfuric acid.

But since Vieille-Montagne has switched from the older horizontal retorts to the electrolysis route for zinc production, the residue from the leaching step has become the major source of cadmium. And the firm has devised a unique route for combining cadmium recovery from the dust and from the leaching operation.

Both the dissolved dusts and the extract from the leaching solution contain an almost identical mixture of cadmium sulfate. They are combined and the cadmium is precipitated with zinc dust. While the resulting zinc sulfate solution is used to dampen the ore fed to the roasters, the cadmium-bearing slime is redissolved in sulfuric acid. This solution is then treated to extract thallium sulfate (for rat poison) and the cadmium is finally recovered by electrolysis.

Germanium: The zinc ores normally contain 0.005% germanium, which is precipitated in the sludge from the leaching step of the zinc process. It is sublimated along with zinc oxide in the gases passing overhead in the fuming furnace. Not all of the germanium is precipitated in the subsequent leaching step; but since the precipitates from the zinc process are recycled to the fuming furnace, the germanium concentration builds up in a closed cycle. In normal operation, its concentration in the sludge from the fuming furnace leach is 0.3%.

This germanium is washed out of the sludge with water. It is again precipitated in a 2-3% "concentrate," which is heated with hydrogen chloride to form germanium tetrachloride. This is purified by distillation.

Pure germanium tetrachloride is then converted into germanium hydroxide by treating it with low-ion-content water. The hydroxide is calcined to germanium oxide in electric furnaces. The oxide is reduced to pure germanium powder with hydrogen at 1200 F, then melted into a solid germanium bar at 1830 F. Finally the bar is hyperpurified by a conventional zone-freezing process.

Mercury: Annual mercury production averages 5 tons, which is recovered from 0-0.6% in the sphalerite ore. Almost all of this is vaporized in the roasting furnaces. The vapors are deposited in the Cottrell precipitators. And the precipitator sludge is heated in muffle furnaces to distill the mercury.

While the residue, which is rich in lead sulfate, is recycled to the lead blast furnaces, the impure mercury is redistilled in an airtight chamber. Finally, the condensed metal is filtered.

This emphasis on by-product recovery at the 70-year-old Balen plant, originally producing only zinc, has led Vieille-Montagne to what may well be today the most modern nonferrous metals complex in the world.

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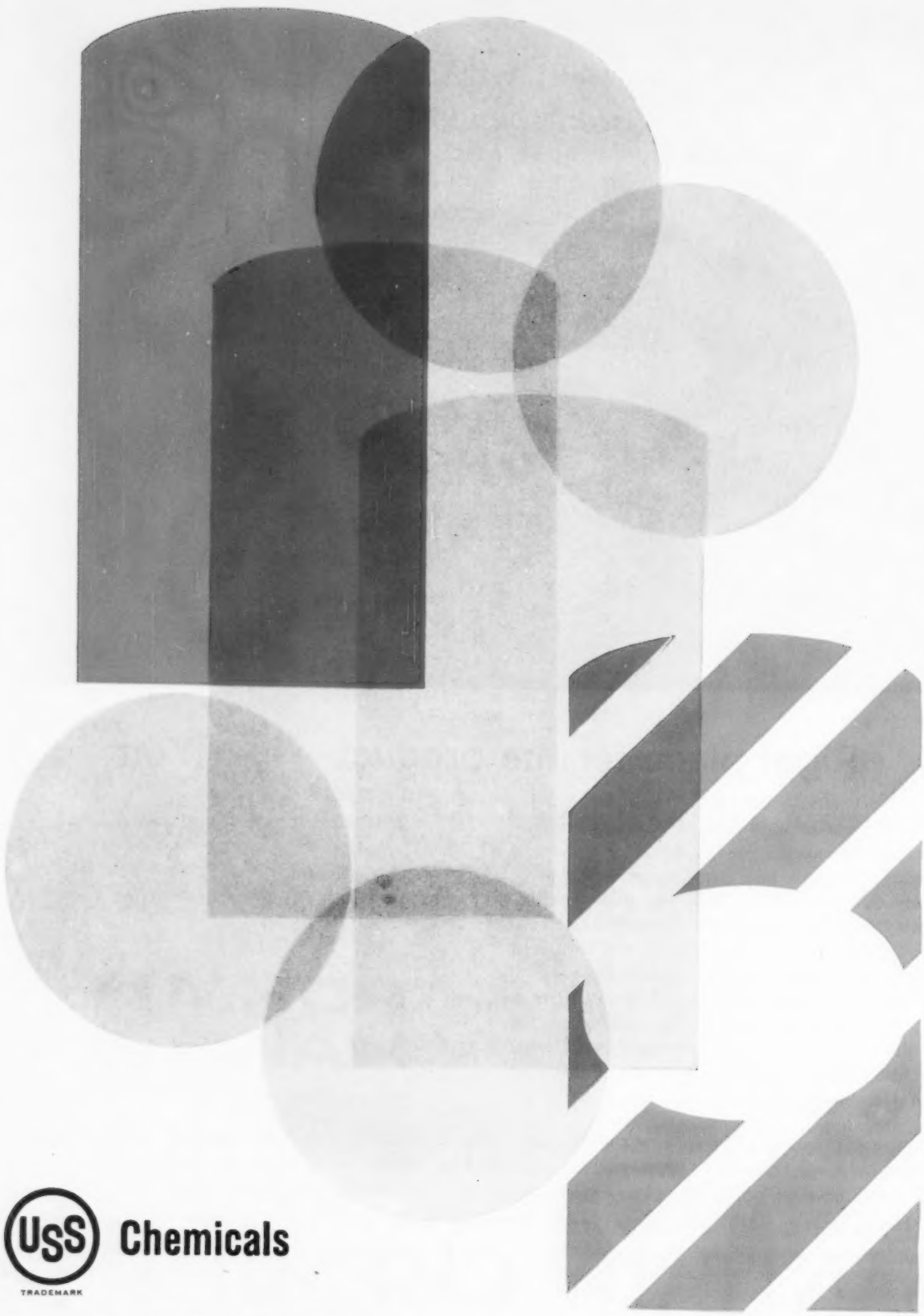

USS Chemicals

TRADEMARK

How shadow-thin coatings protect a multi-million dollar market When soft drink producers decided to sell soft drinks in cans, they knew that the many added conveniences of the new package would be worthless if the flavor of the soft drink became affected by the coating on the can. The producers of synthetic enamel coatings make sure that won't happen. These inert, insoluble, continuous protective films isolate the beverage from the can and impart no flavor themselves . . . in spite of the fact that the coatings are made from some 23 different chemical materials • Stoner-Mudge Company, a Division of American-Marietta Company, produces such protective coatings. Each can has two separate lining formulations on both the body and ends. And yet—the total weight of these interior coatings on a soft drink can is less than ½ of 1 gram—about 1/1000 of a pound. Although the film is minute, extreme care in formulating and production of these enamels is necessary. The strictest of quality controls are exercised from incoming raw materials right through production and packaging. The purity of each ingredient must meet the exacting specifications that have been established through years of experience in formulating linings for food containers • Stoner-Mudge has selected USS Toluene as a solvent to carry vinyl resin coatings to the can. This high purity, nitration grade Toluene readily evaporates completely and leaves no residue. It is ideal for this and similar applications. You, too, can obtain the same high standards of purity with chemicals from United States Steel • Benzene • Toluene • Xylene • Phenol • Cresol • Cresylic Acid • Naphthalene • Creosote • Pitch • Picoline • Pyridine • Ammonium Sulfate • Ammonium Nitrate • Anhydrous Ammonia • Nitric Acid • Chemical Sales Offices: Pittsburgh; New York; Chicago; Salt Lake City; Fairfield, Alabama.

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Packaged Gas

A novel hydrogen sulfide process developed by Girdler Corp. (Louisville, Ky.) is now being offered for sale in skid-mounted package units with product capacities of 1-5 tons/-day. Prices: $90,000 to $170,000, depending on capacity and the extent of accessories required to tie the packaged unit into the main plant.

Girdler, which built four similar hydrogen sulfide units (one was put in for Freeport Sulphur in Cuba, one in Canada and two in the U.S.), developed the new packages to fill a growing need for hydrogen sulfide in larger-than-cylinder quantities by chemical processors using hydrogen sulfide to precipitate metals such as nickel and cobalt. The units are 10 ft. wide, 16-22 ft. high, 21-30 ft. long.

Process: Heart of the system is a simple reactor that combines hydrogen with molten sulfur at 800-900 F and about 100 lbs./sq. in. gauge. Since the reaction is exothermic, the temperature is maintained without external heat. Reactor temperatures are controlled by varying the temperature of the molten sulfur.

Leaving the reactor, both hydrogen sulfide and entrained sulfur vapors are washed and partly cooled with molten sulfur in a packed absorption tower. This condenses the sulfur vapors. The hot molten sulfur leaving the wash tower is cooled to about 300 F in a low-pressure steam generator. And trace amounts of sulfur left in the hydrogen sulfide gas are removed by cooling. Two water coolers, operated in parallel, are alternately shut down to remove the sulfur solidified on the tubes by melting it with steam. The product gas, essentially free from sulfur, is available at about 80 lbs./sq. in. gauge and 100 F.

If sulfur supplied to the unit is mined, its ash content requires a blowdown of about 10% to avoid a buildup in the reactor. Virtually any source of hydrogen is satisfactory, although impurities (e.g., nitrogen, if ammonia is the hydrogen source) are carried out in product vapor.

Based on use of 98%-pure hydrogen at 110 lbs./sq. in. gauge and a 10% sulfur blowdown, utility consumptions per ton of product gas are: hydrogen, 24,000 std. cu. ft.; sulfur, 2,100 lbs.; electricity, 264 kilowatts; steam, 14,-400 lbs.

Introduced to meet the many demands for a more concentrated solution, TAM Zirconium Acetate Solution, 22% ZrO_2, is now available to the chemical industry.

Color: Clear to very light amber
Specific Gravity: 1.46
pH: 3.8 to 4.2 at 20° C
Stable indefinitely at room temperature

APPLICATIONS ARE:

1. As an ingredient in "renewable" type water repellents for textiles.
2. As a catalyst for curing silicone resins in water-repellent treatments for leather and textiles.
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SHIPPED in 500 lb. (net) drums with P. E. drum inserts.

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For general information about isobutyl alcohol refer to our brochure B-104. For questions concerning your specific product or process get in touch with the Eastman representative nearest you or write our Customer Service Laboratory.

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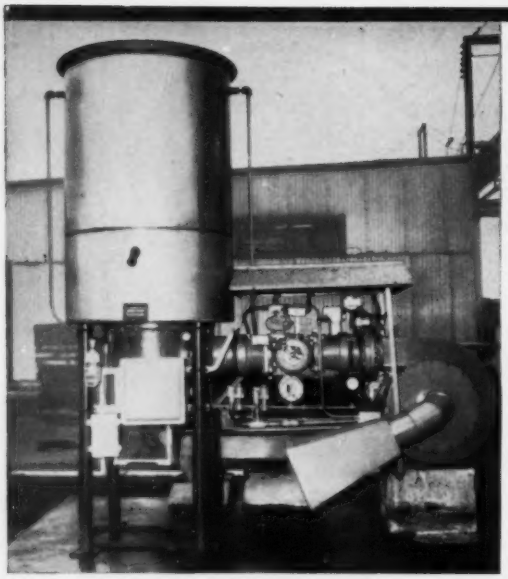

Packaged THERMAL Waste Burner System installed at The Trubek Laboratories Inc. is used to burn waste solvents and mixed aromatics. It provides automatic and complete, odor-free incineration.

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Soil Sealer

A two-year-long series of tests on reducing seepage in an irrigation canal near Phoenix by using a chemical additive called SS-13 (Soil Sealer-13) show that the average water lost through seepage was reduced 84%.

The U.S. Bureau of Reclamation (Boulder City, Nev.) and the Salt River Valley Water Users' Assn. (Phoenix) conducted the tests.

Such significant reduction in water losses means big dollar savings in many areas of the U.S. where seepage losses drain precious water from irrigation ditches, stock feeding ponds, ornamental lakes, etc. In one Southwestern test, the cut in water losses (from 500 to 150 gal./minute) paid for treatment in 60 days.

The chemical nature of SS-13 has not been disclosed, other than its carrier is diesel fuel (*CW, Dec. 3, p. 62*). It increases hygroscopic properties of individual soil particles. Warning: SS-13 poisons fish, although it is harmless to animals and human beings and has been certified to have no effect on the meat or milk of cattle drinking it. The material is available from the manufacturer, Brown Mud Co. (Torrance, Calif.), at $45/50-gal. drum (slightly lower in tank-car lots). Recommended treatment concentrations: one part/1,000 parts of water. And it is applied by simply dispersing the SS-13 in the water of the pond or ditch.

More Beryllium

Mineral Concentrates and Chemical Co., Inc. (Denver), says it has perfected a thermic-flotation extraction process for economically processing low-grade U.S. beryllium ores.

While details of the process were not disclosed, it is said to produce three grades of beryllium oxide with purity above 96.9. Other beryllium products include a liquid beryllium nitrate and compounds of acetate, sulfate, oxalate, hydroxide, fluoride and carbonate. H. K. Hee, president of Mincon, says that a second processing mill with 50-tons/day capacity is under construction in the Lake George area of Colorado. The firm has confined its activities to milling and processing beryllium and is not affiliated with any mining or exploration firm.

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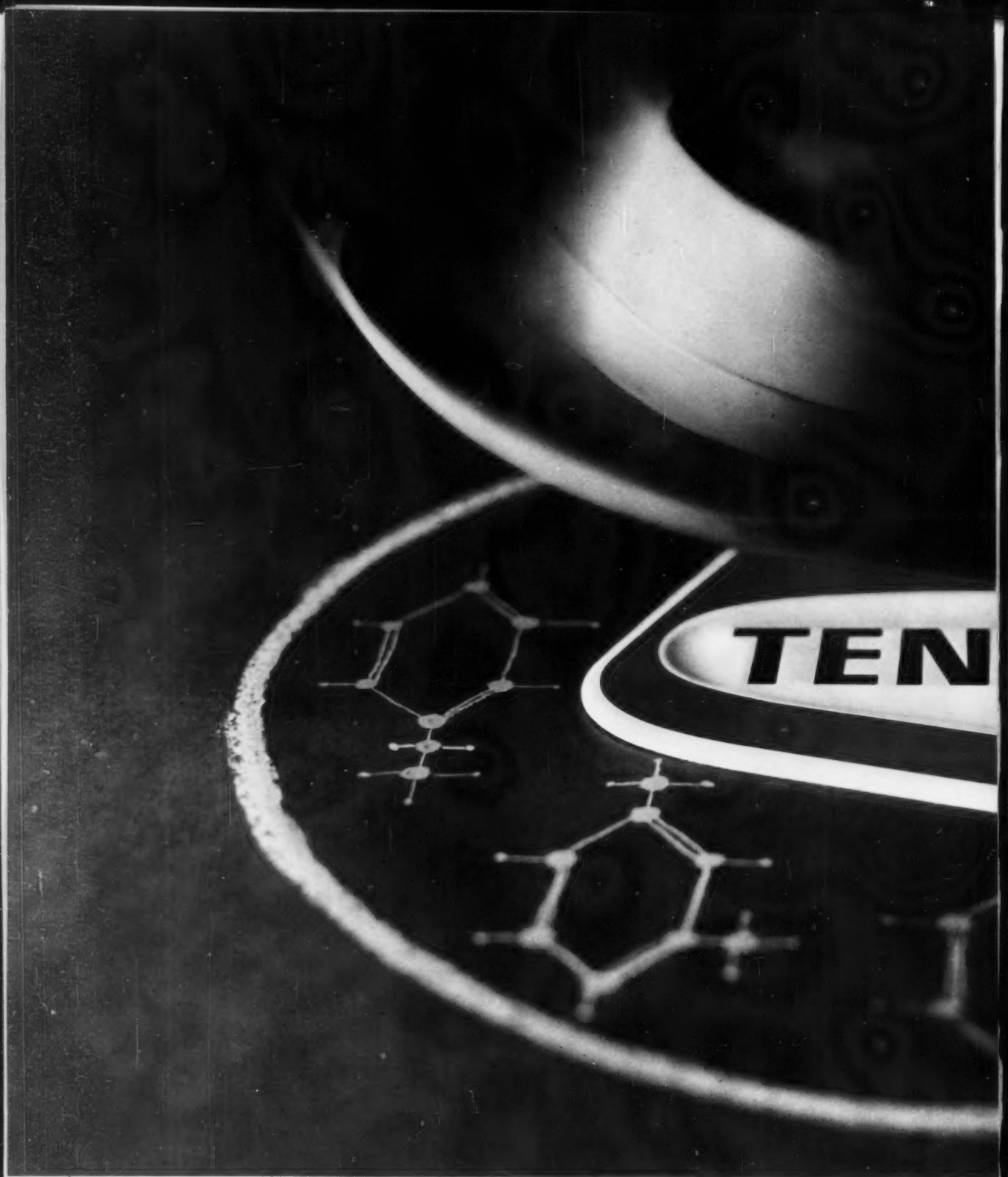

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LUMMUS

ENGINEERS AND CONSTRUCTORS FOR INDUSTRY

New Shawinigan process lowers production cost of hydrogen cyanide

A new hydrogen cyanide process, developed by Shawinigan Chemicals Ltd. of Canada and available through The Lummus Company, produces HCN from ammonia and hydrocarbon (methane or propane) in a non-catalytic, oxygen-free reaction. The process – first commercial application of the "FLUOHMIC"* reactor – offers low production costs and ease of operation.

Yields on hydrocarbon and ammonia exceed 85% with negligible undecomposed ammonia carry-through, simplifying recovery or disposal requirements. Furthermore, valuable high-purity hydrogen by-product is available for use as required.

The Shawinigan HCN process produces hydrogen cyanide competitively using 8 mill power and 25-30¢ per MSCF natural gas. It becomes increasingly attractive in areas of lower power costs or higher cost hydrocarbon. A commercial scale reactor is being operated by Shawinigan Chemicals Ltd.

How the Process Works

The reaction system uses a uniquely designed fluidized bed reactor to realize the efficiencies of a very high temperature in the hydrogen cyanide reaction.

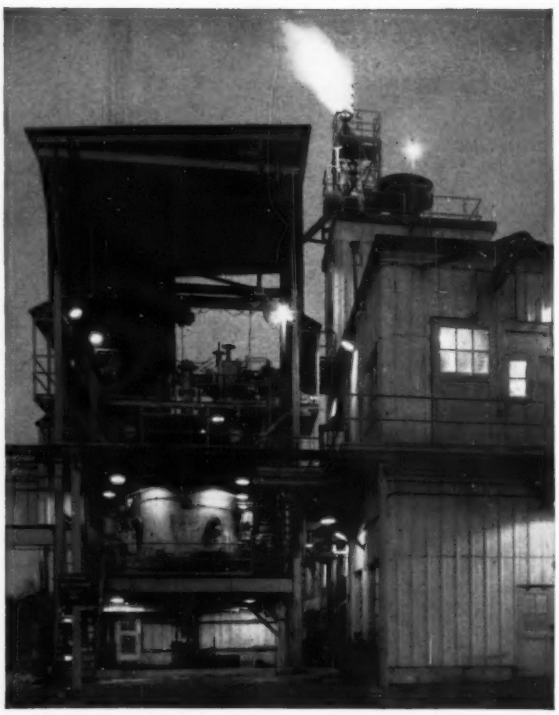
The Shawinigan HCN reactor consists of a refractory lined electrically heated vessel. It operates in the range of 2,400 to 3,000° F. at essentially atmospheric pressure. A non-consumed fluidized bed of coke particles is heated by electrical conduction. The reactor design achieves an extremely uniform high temperature throughout the reaction zone. At these very high temperatures the significant improvement in conversion rates – compared with conventional processing – results in a high concentration of product in the effluent gas. The effluent gas is cooled and purified by standard methods.

Process Advantages

Some major advantages of this process are: (1) Absence of water from the effluent gas. This eliminates the problem of tarry polymer formation in the cooling and recovery section. (2) Considerable reduction in unreacted ammonia in the effluent gas. This eliminates the problem of recovery or disposal of unreacted ammonia. A typical carry-through ammonia content would be 0.3 volume % on net reactor effluent. (3) Greatly reduced stringency in feed-stock purity requirements. This is a natural result of the elimination of catalysts from the process. (4) Flexibility in choice of hydrocarbon feed. L.P.G. can be used where natural gas supply is unavailable or interruptible. (5) Operating rates are flexible. Units will perform well at rates as low as 25% of capacity. (6) High concentration of HCN in the reactor effluent. This may be 5-6 times as high as in present commercial processes.

For further details on this process, contact your nearest Lummus office.

*Trademark – Shawinigan Chemicals Limited



View of the Hydrogen Cyanide Reactor in operation at The Shawinigan Chemicals Limited Cyanide Plant.

THE LUMMUS COMPANY, 385 Madison Avenue, New York 17, New York, Houston, Washington, D. C., Montreal, London, Paris, The Hague, Madrid; Engineering Development Center: Newark, N. J.

Technology
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CHEMICAL WEEK
September 30, 1961

A powerful superconducting magnet has been built by Westinghouse. This could have far-reaching ramifications. The magnet is about the size (and shape) of a doughnut, weighs 1 lb. and produces a magnetic flux of 43,000 gauss. This is about twice as strong as an automobile-size, iron-core electromagnet, which would weigh about 20 tons. Moreover, the superconducting magnet runs on an ordinary automotive storage battery that supplies the power lost in lines leading to the magnet. The iron-core version needs a steady power source of about 100 kw.

The magnet consists of a solenoid of fine wire made of columbium-zirconium. This is immersed in liquid helium to maintain a temperature near —450 F. Key to the success of the project, says Westinghouse, is the wire, which was designed, prepared and drawn by its research labs, the materials manufacturing department (Blairsville, Pa.) and Armetco, Inc. (Wooster, O.).

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Such a magnet has long been sought by researchers. For some time, it had been thought impossible because metals lose their superconductivity when exposed to strong magnetic fields. Bell Telephone Laboratory researchers disproved this. Working with a columbium-tin compound, and with columbium-zirconium, they showed that certain superconductors retain magnetic properties even in strong fields. A number of other firms have been working on columbium-zirconium alloys. Last June Atomics International reported a wire (of three parts columbium to one part zirconium) had conducted 100,000 amperes/sq. cm. in a 30,000-gauss field. And Wah Chang says it is in a position to supply production quantities of such an alloy.

Others have built smaller magnets. But Westinghouse's contribution is in the strength of its magnet. This has been made possible by the production of sufficient lengths of wire—of uniform quality. The model built contains about a half mile of wire approximately the diameter of a sewing thread. Some 5,000 turns are wound into the coil.

The Westinghouse work is further encouragement that superstrength magnets can be built. As J. K. Hulm, associate director of the firm's research labs, sees it, the development "enhances chances for direct, large-scale generation of electricity, permits a new generation of atom smashers, increases possibility of a magnetic bottle to contain nuclear fusion and makes more feasible some of the methods proposed for long-distance space travel."

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A fire-resistant woodfiber aimed at acoustical tile markets has been developed by Simpson Timber Co. (Seattle, Wash.). The product (Pyro-Chem protection) is made with fire-resistant chemicals, is said to be as "fire-safe" as incombustible mineral tile.

Addition of the fire-resistant chemicals adds 1½-2¢/sq. ft. to production costs. Product installation costs (estimated at 40-50¢/sq. ft.)

are thus slightly higher than that of combustible tile but appreciably lower than the 60-70¢/sq. ft. for mineral tile. Simpson will make the new material at its Shelton, Wash., plant.

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Foote Mineral will install beryllium recovery equipment for experimental treatment of the beryl reserves in its Kings Mountain, N.C., plant. The largest known deposit of domestic beryl occurs in the spodumene-tin belt extending in a narrow strip from near Gaffney, S.C., to Lincolnton, N.C. The U.S. Bureau of Mines has been operating a pilot plant on the Foote property in its program to obtain finished beryllium products from beryl concentrates.

Foote will also install additional large-scale grinding facilities at Kings Mountain to supply increasing markets for spodumene-type stone and other mineral and metal products. A grinding mill will be there from Cold River, N.H., to process imported petalite ores and locally produced spodumene ores "for the ceramic and porcelain industries." It is believed that Foote has been supplying Lithium Corp. of America with spodumene. The latter, however, will not discuss its supplies at the moment.

•

A new nuclear waste evaporator has passed its final tests. Designed and engineered by General American Transportation, it was built for Martin's PH-1 (Portable medium power range), which is aimed at supplying 1 million watts to delicate electronics equipment. The evaporator can concentrate "thousands of gallons of low-level waste" to fit into a 500-gal. storage tank.

Solids content of the original waste varies from trace quantities to 20% by volume. This will be concentrated to about 65%. The unit, built of stainless steel, will employ thermal shock cleaning; steam will be sent through the lines, followed by cold water. The sudden change in temperature will "pop" the scale free.

•

Watch for a new self-thickening latex paint from Monsanto. It's expected to appear on the market soon, will probably consist essentially of a 50-50 mixture of latex and oleoresinous emulsion. Some of the thinking behind Monsanto's approach was expressed in a talk by John Heaps of the firm's Plastics Division, at a conference on high-polymer coatings at the University of California at Los Angeles (*see also, p. 24*).

After extensive experiments, Monsanto has concluded that a variety of problems with latex paint can be attributed to thickeners. (Water-soluble polymers or their alkaline salts are normally added as thickening agents.) These serve to flocculate both pigment and polymer particles, Monsanto claims, with resulting problems in color, strength, gloss, fade resistance, color uniformity, clarity, durability and adhesion. Heaps described Monsanto's work in attempting to get an optimum latex paint, in which each particle would be surrounded by polymer vehicles. His suggestion for the most promising approach: a heterogeneous mixture of latex and a fine-particle emulsion of a fatty ester.

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Our Explosives Division is building, and will operate for Solar Nitrogen Chemicals, Inc., a $15,000,000 facility for making ammonia, urea and related products. Solar is owned equally by Atlas and The Standard Oil Company (Ohio).

Our International Division was formed to take over export of all Atlas products, and to direct and expand manufacturing and marketing operations outside of the United States.

The Stuart Company was recently merged with and into Atlas. As an Atlas Division, it will continue to manufacture and market ethical pharmaceuticals.

The "Powder"—or explosives—business is still important to us, and we expect it to remain so. Diversification into several chemical fields led us to change "Powder" to "Chemical," and to bring all our corporate operations together under "Industries." So, our new official corporate name is "Atlas Chemical Industries, Inc."... while the past lives on as we retain our original NYSE ticker symbol—"APC." We hope you like the new name...and that you'll continue to call us "ATLAS."

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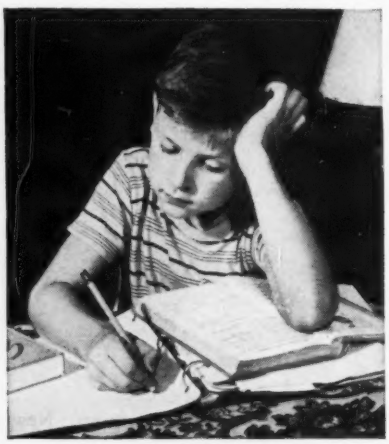
HOW HERCULES HELPS...

MAKE EXPLOSIVES WORK BETTER—Construction officials examine model of the Niagara Power Project, a mammoth 3-year job on which Hercules® explosives were used to blast out a large portion of the 38 million cu. yds. of excavation, mostly rock. This work included application of the economical, efficient, Hercules-developed Presplitting technique that leaves wall faces smooth, perpendicular and exact to within a 6" tolerance.

WHEN HEAT AND PLASTIC MEET — Resistance to heat from the projector light made Pro-fax® polypropylene a "must" for this magnifier-projector. Other plus features: the machine is readily portable, being made from the lightest of all plastics —it is virtually unbreakable—and the rich, colorful finish is immune to staining.



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CHEMICAL MATERIALS FOR INDUSTRY

G61-9

In Hot Pursuit of Space-Age Materials

At Phoenix, Ariz., earlier this month nearly 1,500 industrial and other technical representatives heard about advances in the development of materials that will be needed to meet future Air Force requirements. Occasion: a symposium of the Aeronautical Systems Division (Wright-Patterson Air Force Base, O.) of the Air Force Systems Command. CPI interest ranged from superalloys and plastics to polymers for fibrous materials and ceramics for ablative materials (*see table*).

ASD's current (fiscal '62) budget for applied materials research is $19.4 million, and a 10% increase is hoped for next year.

Since the Air Force is concentrating on space-age applications the main course of its research is aimed at getting lighter-weight materials with higher thermal resistance. Attacking the heat problem are superalloys—developed to withstand relatively high stresses at high temperatures. New plastics, which can retain their strength for a short time at temperatures well over 1000 F, are being groomed to tackle the weight problem.

Superalloys and Special Metals: The three groups of superalloys—nickel-base, cobalt-base and iron-nickel-chromium-base—have found particular success in the temperature range of 1200-1800 F. There they have an excellent strength-to-weight ratio and good oxidation resistance.

Nickel-base alloys have progressed well beyond Nichrome V (80% nickel and 20% chromium), developed by

A Glance at Air Force Materials Developments

Material	Status
Superalloys	Nickel-base: Complex precipitation-hardened alloys are the most advanced. Better thermal shock resistance is needed, although their other properties are good. Cobalt-base: Improved strength characteristics are needed, although these alloys show excellent creep and rupture properties, good oxidation resistance. Iron-nickel-chromium-base: These have less-glamorous strength properties. Especially sought now are materials to fill the 1800-2000 F gap. Less-complex fabrication is wanted. And new alloys, such as those based on vanadium, columbium or other metals, are being extensively studied.
Special metals	Combined temperature-weight barriers have led researchers to work on programs with low probability of success but with high payoff. Vast improvements are needed. Metal systems of beryllium, scandium, yttrium and the rare earths are under study. Current techniques include high static and dynamic pressures and ultra-rapid quenching.
Plastics and adhesives	Top capability in laminating resins is 500 F for long exposure, 700 F for short (nonablative materials); new organic, semi- and nonorganic polymers are being researched to raise the limit. For above 1000 F, phosphate bonded oxides or "chemical reaction cements" are promising for sustained usage. Adhesives are well behind other materials in achieving new, better properties. Room-temperature curing adhesives and both high- and low-temperature resistance is needed. Adhesives for metals are making progress.
Ablative materials	These materials restrict heat flow by expending thousands of Btus. per pound. To operate at extremely high temperatures, plastics and ceramics (reinforced and not) are under study.
Lubricants	Need exists for lubricants operating above 1000 F. A ceramic-bonded film made of lead oxide and sodium silicate may fill the need. Films of silicon dioxide and boric oxide look promising for 1250 F work.
Coatings	Radiant heat transfer in space can be controlled by coatings with selective optical properties. Mechanisms of the optics require more study.
Ceramics and intermetallics	Refractory inorganic nonmetallics (ceramics) are expected to remain brittle materials, in most cases, and thus have limited usefulness. Study is under way on borides, beryllide coatings, powder-formed carbides, and others. Much basic work is needed.
Fibrous materials	Existing fibers cannot stand the unique combination of properties in space—e.g., nylon is unusable above 300 F; glass fiber has poor abrasion resistance. Fibers will be made from new polymers, metals and metallic oxides in organic polymers. The new polymers will have residual unsaturation for cross-linking.

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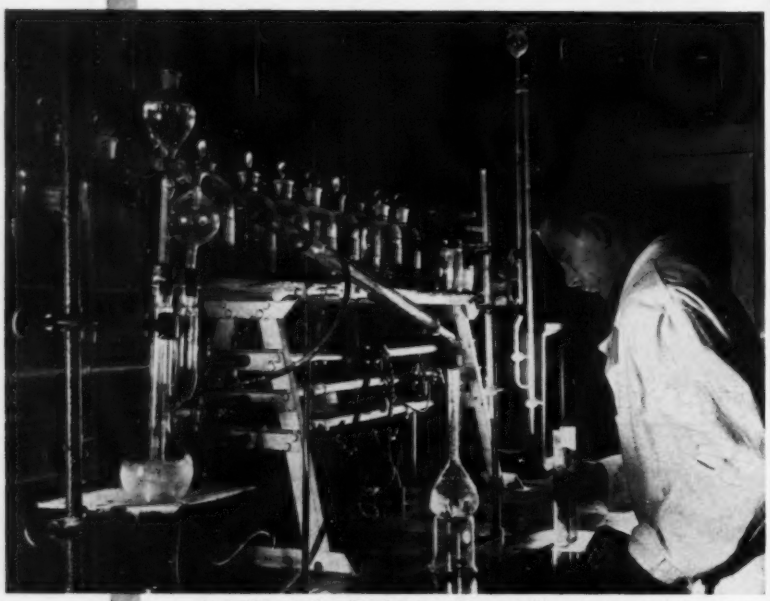

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the British for use in gas turbine engines. Cobalt, aluminum and titanium have been added in various proportions and combinations. Refractory elements—e.g., molybdenum, tungsten and tantalum—are also being tried in nickel alloys. And minor additions of boron and zirconium strengthen them by occupying voids in grain boundaries, thereby increasing rupture life and ductility.

Cobalt-base superalloys have developed at a slower rate because of a lack of government support and limited industrial interest. But these alloys have found some use, especially where excellent creep and rupture properties were required, together with oxidation resistance up to 2000 F.

Chromium carbide and refractory metals have been added to the cobalt-base alloys via a solid-solution hardening process. And alloying with nickel stabilizes the high-temperature crystallographic structure of the cobalt.

The Air Force reports that wrought alloys must be developed with strength and stress-rupture properties equal to those of cast alloys. One approach being taken: addition of titanium to the alloys.

Cast alloys, in turn, need a higher level of reproducibility without need for vacuum melting and casting techniques. Adding boron to these alloys may do the job.

Columbium, tantalum and other base metals are also being studied, while the rare earths are being looked at as alloying ingredients.

Plastic Gains: The main research on plastics for space equipment is in matrix materials—both organic and inorganic laminating materials—and reinforcing agents. Reliability and ease of processing have been of some concern to researchers, but the chief objective is to improve high-temperature stability.

A chelate coordination polymer (*CW, Sept 16, p. 33*) is one new type of plastic under study. By coordinating with metals, temperature stability can be introduced into a polymer. Typical is the coordination polymer formed when methylene bis-(salicylaldehyde) is reacted with diethyl zinc in a pyridine solvent.

This polymer is one of the first chelate polymers from which any laminate could be made. It seems to be

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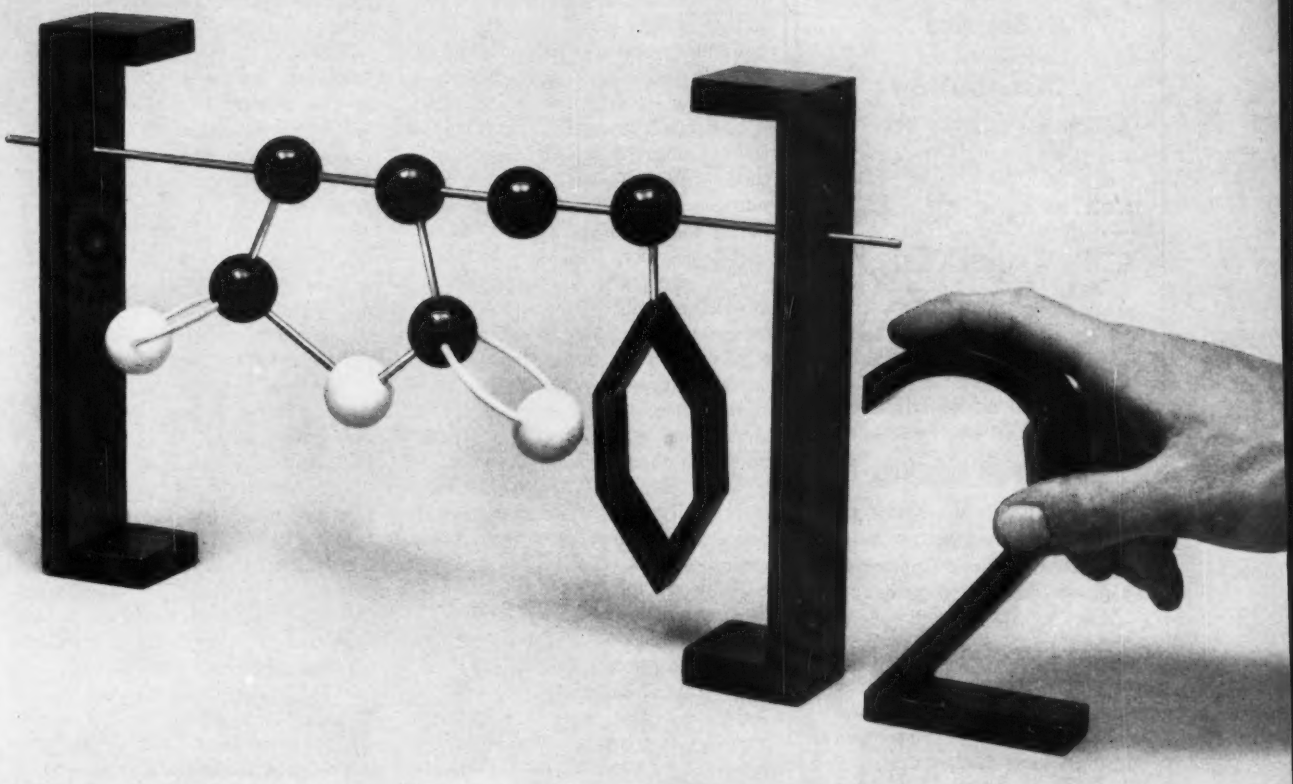

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the best way, so far, to achieve optimum over-all quality. But high molecular weight and toughness—two desirable properties that seem to go together—have not been attained.

Another resin attracting attention is a borazole resin that has thermal stability above 800 F. Its basic structure consists of alternate boron and nitrogen atoms. This bonding is similar to the coordinate bonding in the chelate polymer.

The problem of making high-molecular-weight plastics (with high-temperature resistance) might be circumvented by making high-molecular-weight organic polymers and converting these into semiorganic polymers. For example, the methylene bridges in phenolic resins are thermally weak linkages. When replaced by inorganic groups, they could yield desirable high-molecular-weight inorganic polymers.

However, for long-term temperature capabilities above 1000 F, "chemical reaction cements"—a system of phosphate bonded oxides—are being researched.

Coatings And Ablatives: Coating problems in a space environment revolve around the effects of ultraviolet radiation, vacuum and temperature extremes. Research is centered on all types of coatings: metallic, organic and inorganic.

But to handle the problem of radiant heat transfer, special optical properties must be built into these materials. As yet the methods of getting these optical properties have not been developed. Consequently a great deal of basic work must be done before the development program can get under way.

Work on coatings is tied into the development of ablative materials. Here, however, instead of trying to keep a surface from breaking down by external forces, the material is purposely allowed to degrade to absorb and dissipate high heat loads.

Both homogeneous and composite ablators are being studied. The former include plastics such as polytetrafluoroethylene, polyethylene, polyamides, phenolics and foamed resins. Typical composites are organic resins reinforced with fibrous materials (e.g., glass fiber-reinforced phenolics).

Adhesive Target: The conjecture that adhesive developments have not kept pace with advances in other materials is substantiated by a six-year-old, still-unfulfilled Air Force specification. Back in '55 a target was set: an adhesive that would hold up under 1,000-psi. tensile lap-shear strength at 500 F after 192 hours' exposure to 500 F. Although this requirement is modest, compared with current and future bonding needs, it has not yet been met.

Even when programs for modifying organic adhesives with inorganic groups succeeded in raising an eight-day thermal stability to 600 F, the resultant initial and high-temperature strengths proved to be significantly reduced.

Nevertheless, by borrowing a concept developed in the field of porcelain enamels, research on ceramic adhesives for metals has forged ahead. This concept: when bonding a glass and a metal, adhesion is stronger if the glass contains the oxide of the metal.

Other developments in the adhesive field, include a low-pressure ambient-temperature-curing adhesive based on an amine-cured novolac epoxy resin. This will be used for field and emergency aircraft repair.

Lubricant Hopefuls: The Air Force has developed a ceramic-bonded solid-film lubricant that appears to meet the requirement of resistance to 1000 F temperature and high loads. The film consists of lead sulfide and boric oxide. But it will not completely fill the need until the problem of its decrease in wear life at temperatures below 700 F is overcome.

The National Aeronautics and Space Administration (NASA) has tried a lead oxide and sodium silicate combination. But this also wears down at lower temperatures, even though it has a higher temperature-resistance potential than the lead sulfide lubricant.

At the same time, another program is in progress to develop lubricating techniques usable up to 2000 F. Here, promise has been shown with a porous substrate impregnated with either precious-metal alloys, glasses or metals that form soft oxides.

Ceramics And Intermetallics: The Air Force is doing research on borides, beryllides, nitrides, carbides, silicides and oxides for use as structural materials. Cobalt-bonded tungsten carbide, for instance, is being widely used as an industrial product, but this is

President, Case Institute of Technology
Former Director, National Aeronautics and Space Administration (NASA)

Dr. T. Keith Glennan tells why he feels the best location in the nation is better than ever

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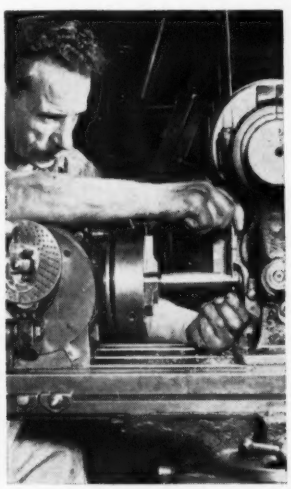

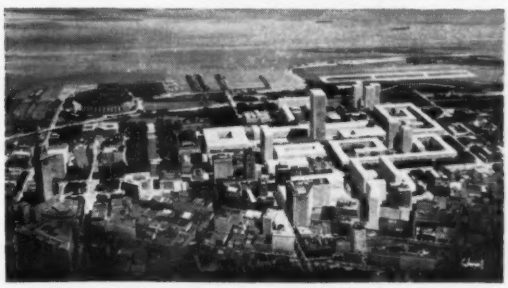

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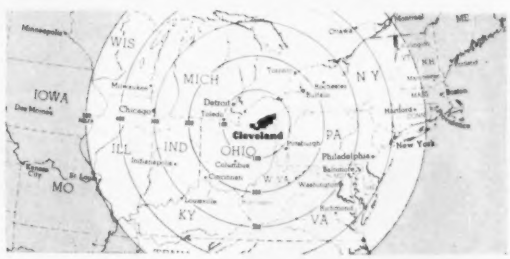

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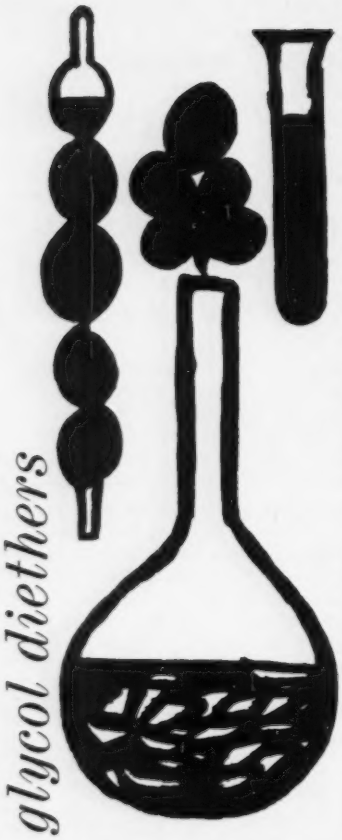

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not indicative of progress in this field.

Surprisingly little is known about the fundamental properties of these materials, and basic research is much needed.

Fibrous Materials: Research work in fibrous materials is in three broad areas: (1) fiber drawing and modification; (2) fibrous structural materials; and (3) coatings for fiber and fibrous materials.

The commonly used practice of spinning fibers from a melt is inadequate when extremely high-melting inorganic materials are used. High temperatures and often very corrosive solutions are required. Consequently, instead of using batches of molten materials, researchers spin at room temperature an organic fiber containing a large percentage of oxides. The composite fiber is then sintered to remove the organic portion (*CW, April 29, p. 61*).

The development of fibers for structural applications has received the most research attention. By blending and coating fibers, very high strengths have been achieved. Superalloys have been drawn into fibers and these have shown very high temperature resistance.

The general direction of the developments reported at Phoenix is toward improved temperature and strength-to-weight characteristics. With a higher budget expected for materials research next year, the pace will be faster—but there is a long road ahead.

U.S. Patent 3 Million

General Electric Co. is the proud possessor of U.S. Patent No. 3,000,000, issued Sept. 12. Subject: an automatic system for reading characters written in magnetic ink.

In honor of this milestone, Patent Commissioner David Ladd wrote in the Sept. 12 *Official Gazette*, "These 3 million patents, published and fully disclosed to the public, make up the greatest and most important treasure of applied technical knowledge in the world."

And, as if replying to critics of the present patent system, Ladd spoke out to hail it as a "vital ingredient" in the country's growth from an agricultural economy to the "greatest and most productive industrial nation in the world."

EXPANSION

• Mobay Chemical Co. (Pittsburgh, Pa.) plans to build a research center in suburban Pittsburgh by the fall of '62. Its present research headquarters and customer service activities will be moved from New Martinsville, W. Va., to the new complex of buildings. About 50,000 sq. ft. of functional area is planned.

• The Kendall Co.'s Chicago Division, manufacturer of industrial tapes and protective coatings, plans a $1.5-million research center in Barrington, Ill.

• Construction of a $175,000 wing to the research laboratories of Frank W. Hornear Ltd. (Montreal, Que.) has begun. One of Canada's largest pharmaceutical firms, Hornear will use the wing as pharmacology and histology departments.

LITERATURE

• Pergamon Press (New York) is offering a translation of what it describes as the first book devoted to telomerization reactions. Called "Telomerization and New Synthetic Materials," it is a 102-page book by R. Kh. Friedlina and Sh. A. Karapetyan of U.S.S.R. Academy of Sciences. Telomerization can be used to make intermediates for fibers, plastics, perfumes and other products. The book is priced at $4.50.

• "Patents on the Reactions of Sugar," compiled by Mildred Hunt, is an update of an earlier edition covering both domestic and foreign patents in which sugar is a reactant. It's free. Write Sugar Research Foundation, Inc. (52 Wall St., New York 5).

• "Current Trends in Scientific Research," by Pierre Auger, is a United Nations and Unesco publication that gives highlights of current research interests throughout the world. Principal chapters are on fundamental sciences, earth and space sciences, medical sciences, food and agricultural sciences, fuel and power research and industrial research. In addition, there are brief sections on trends in organization and reporting of research and on recommendations concerning research, its dissemination and application. The 245-page volume is available from Unesco Publications Center (801 Third Ave., New York 22) for $6.75.

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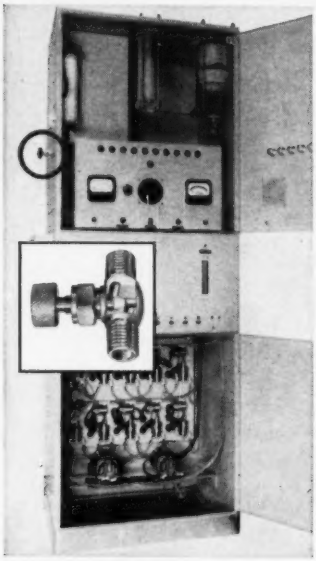

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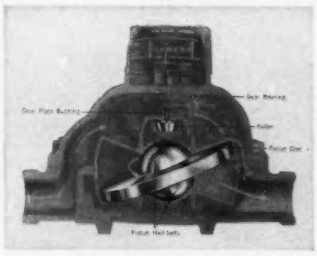
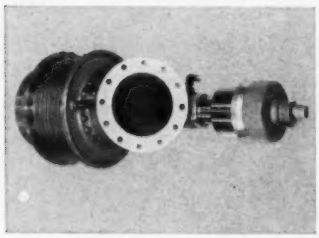


Retains shape, dimension to keep meters on the mark!



Seals in chemical corrosives, even at -400°F (or up to +400°F).

In chemical handling apparatus, KEL-F 81 Brand Plastic defeats corrosion—does it over an unusually wide temperature range, under high pressures, with mechanically strong parts made to a high degree of precision.

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What chemical corrosives can new KEL-F 81 Plastic tame for you? Check the "profile" at right, then call the nearby 3M Chemical Representative for complete technical information and assistance.

Properties Profile on KEL-F® 81 PLASTIC

BRAND

KEL-F 81 Plastic is a fluorocarbon plastic, a thermoplastic resin formed by the homo-polymerization of chlorotrifluoroethylene. The high degree of fluorination of KEL-F 81 Plastic is responsible for its chemical inertness and thermal stability. The inclusion of chlorine in an otherwise carbon-fluorine molecule results in exceptional moldability and mechanical toughness.

Crystallinity. KEL-F 81 Plastic is crystallizable, but not necessarily crystalline, the degree and kind of crystallinity in a given sample being a function of its thermal history. The "quick quenched" resin is spoken of as amorphous, and the "slow-cooled" resin as crystalline. When crystalline, KEL-F 81 Plastic is a denser, more translucent material with higher tensile modulus, lower elongation, and greater resistance to the penetration of liquids and vapors. The amorphous plastic is less dense, more elastic, with greater optical clarity and toughness.

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6. Chemical resistance
7. Electrical properties
8. Infra-red transmission
9. Inert to liquid oxygen
10. Flexible in contact with cryogenic fuels

Processing. KEL-F 81 Plastic can be processed in the same manner as other thermoplastic resins. Parts of KEL-F 81 Plastic may be specified in any form. However, because of time and temperature limitations, compression molding is the ideal method for retaining all of the desirable mechanical properties originally built into the basic polymer. Other processing methods, such as injection molding and extruding can be used to achieve the same degree of quality, but special attention to processing techniques is required to avoid excessive degradation.

Detailed discussion of the properties, applications and other technical data is contained in a free brochure. For your copy, write 3M Chemical Division, Dept. KAK-91, St. Paul 6, Minn.

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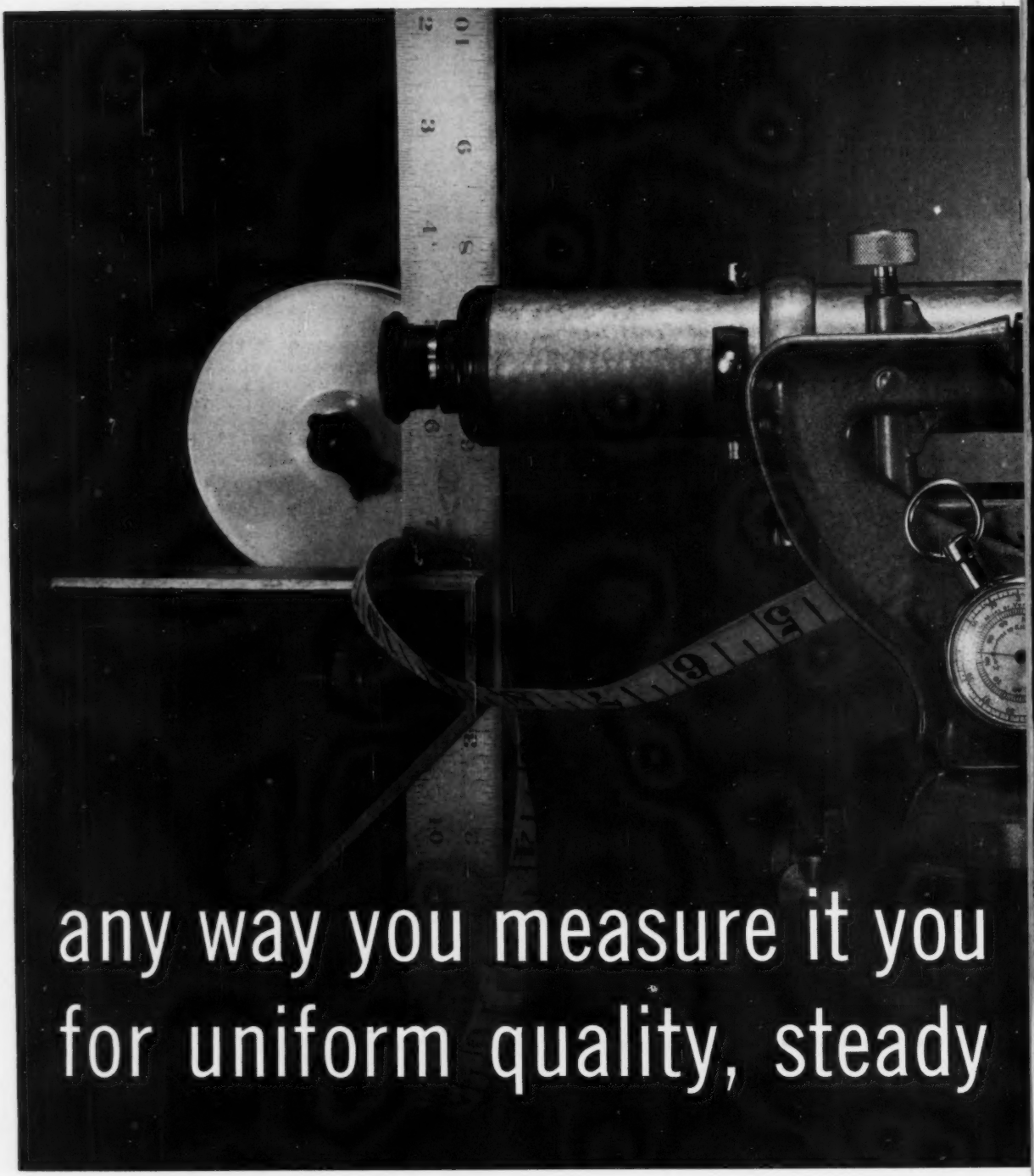

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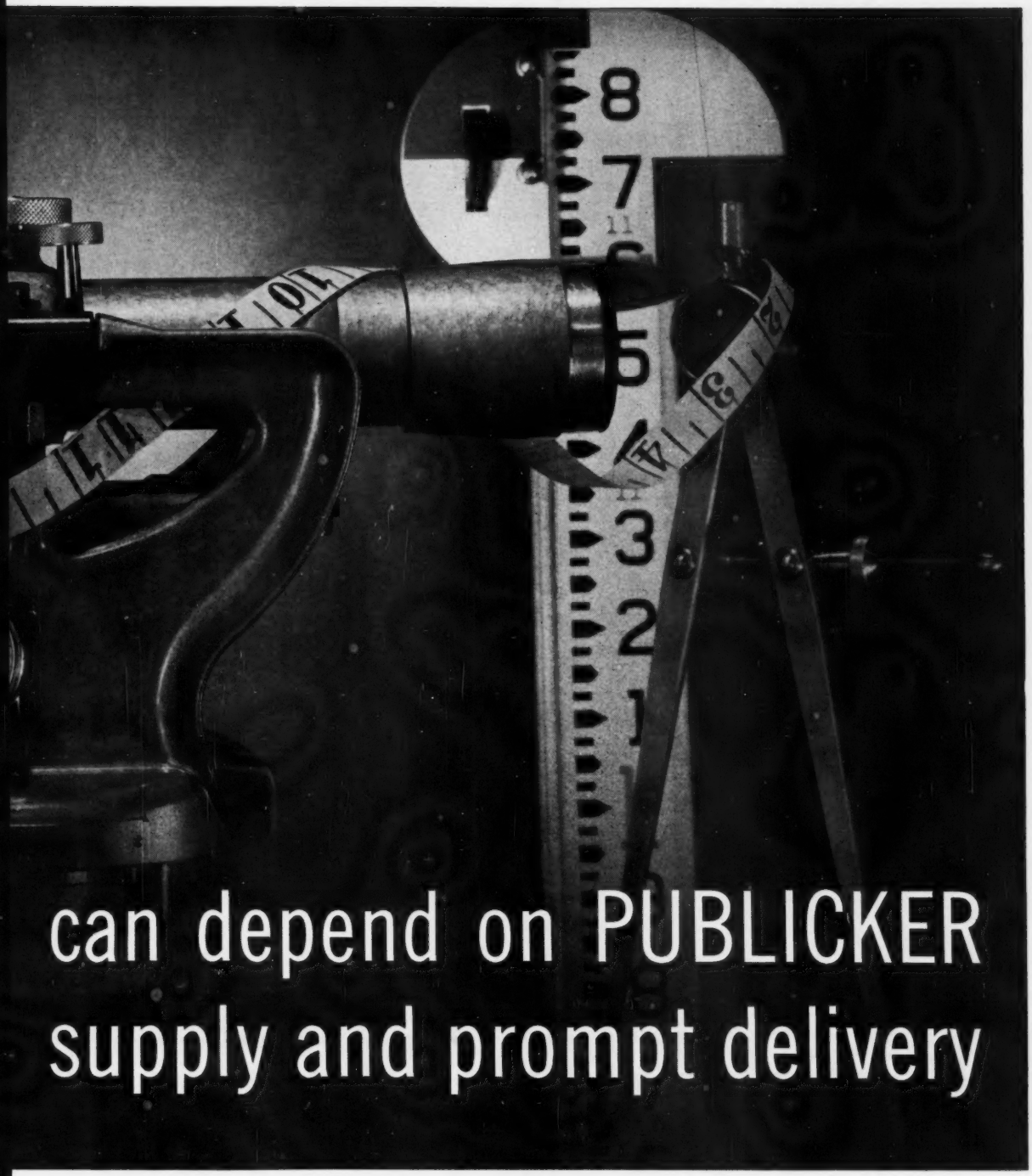

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Market Newsletter

CHEMICAL WEEK
September 30, 1961

AviSun will market a new, biaxially oriented polypropylene film in early '62. The new film was touted last week, during dedication ceremonies marking completion of the firm's new, 100-million-lbs./year polypropylene plant at New Castle, Del.

AviSun also confirmed that it has plans for active participation in production of polypropylene textile fiber in Japan in cooperation with the company's licensee, Shin Nippon Chisso Hiryo K.K. Chisso is putting up a plant slated for completion in early '62. Details about marketing plans haven't been revealed.

•

And Hercules Powder has completed construction of its 12-million-lbs./year (initial capacity) polypropylene fiber plant at Covington, Va. The fiber is now produced at the former Industrial Rayon Corp. nylon plant, which was completely redesigned for Hercules polypropylene fiber production. Included in the new unit is a complete fiber research center.

•

Meanwhile, other synthetic fiber producers are juggling fiber prices. Chemstrand recently knocked 16% off Acrilan acrylic fibers used for carpeting, and last week Du Pont followed suit with a 7¢/lb. reduction on its carpet-grade Orlon acrylic fiber (also posted other reductions on other grades of Orlon). Much of the price cutting is attributed to increasing competition with wool for carpeting markets.

Du Pont also hiked price of Lycra spandex fiber (an elastic fiber used for swim suits, etc.) by 50¢/lb.; presumably this relatively big increase will do much to offset earnings losses resulting from lower Orlon prices.

•

More perchlorethylene and trichlorethylene will flow into world markets from a new plant put onstream recently in Austria (Bruckl, Carinthia province). The unit is owned and financed ($500,000) by Donau Chemies, AG. (Vienna). Output is slated mainly for export markets.

U.S. perchlor and trichlor markets have long been plagued by influx of foreign-made material—often sold here at cut-rate prices. But recent price increases by U.S. producers (*CW Market Newsletter, Sept. 9*) suggested that competitive pressure from imported solvents had eased—at least temporarily.

It's not yet clear where output of the new Austrian plant will be marketed; but even if Europe, rather than U.S., is the target, the effect may nonetheless be to release additional foreign supplies, made by other producers, for sale in the U.S.

•

Austria now also has its first methanol plant. A 10,000-metric tons/year unit operated by HIAG Werke AG. (Vienna-Fischamend) and built at a cost of $1.5 million went onstream a few weeks ago.

Sharp increases in Austria's domestic requirements (from 1,850 metric tons in '50 to 12,000 tons in '60) justified plant construction; up to now total demand was met by imports from the U.S.S.R., Czechoslovakia, Hungary and Italy. Up to 80% of the plant's methanol output will probably be converted into plastics intermediates for local use.

•

Price is the pry Dynacolor Corp. is using to break into the lucrative home-movie color-film field nationwide. The company has just signed distribution agreements with four top U.S. photographic supply and distribution organizations that will open 25,000 retail outlets for the film maker. The distributors: Arel Inc. (St. Louis, Mo.), Hornstein Photo Sales (Chicago), Raygram Corp. (Mt. Vernon, N.Y.), and Western Movie Inc. (San Francisco).

Dynacolor's "with processing" price on its Dynachrome color film is $2.39 on 8-mm. movie film, $1.99 on 35-mm. (stills, 20 exposures).

The firm, a major processor of Kodachrome 8 movie film and 35-mm. slide color films, recently completed arrangements for sale of Dynachrome at all military PXs in the U.S. and overseas, and has broken into the Canadian market within the past three months. In addition the film is being sold nationally under private-brand labels by retail chains, including Sears, Roebuck and Walgreen's. Such activities have boosted Dynacolor's sales from approximately $125,000 in '55 to an estimated $11 million this year.

•

Union Carbide took a stand on polystyrene prices last week by posting a 1¢/lb. increase on crystal, natural and colored materials. Carbide's decision differs from positions taken earlier by Dow, which upped prices on crystal polystyrene, kept other prices on other grades stable, and by Monsanto, which kept original crystal prices intact but boosted tabs on colored general-purpose materials (*CW Market Newsletter, Sept. 16 and 23*).

•

Canadian Industries Ltd. will construct a $900,000 plant to produce trinitrotoluene (TNT) and dinitrotoluene at the firm's works at Beloil, Que. The plant is slated for completion by mid-'62.

TNT is not now made in Canada; but CIL made it in the past, until an explosion at the Beloil works a few years ago knocked out the original unit.

Main use for TNT is in slurry-type blasting agents, which have grown in favor for open-pit mining operations. TNT is a preferred sensitizer incorporated with ammonium nitrate and water (usual mixture: 65 parts nitrate, 20 parts TNT, 15 parts water.)

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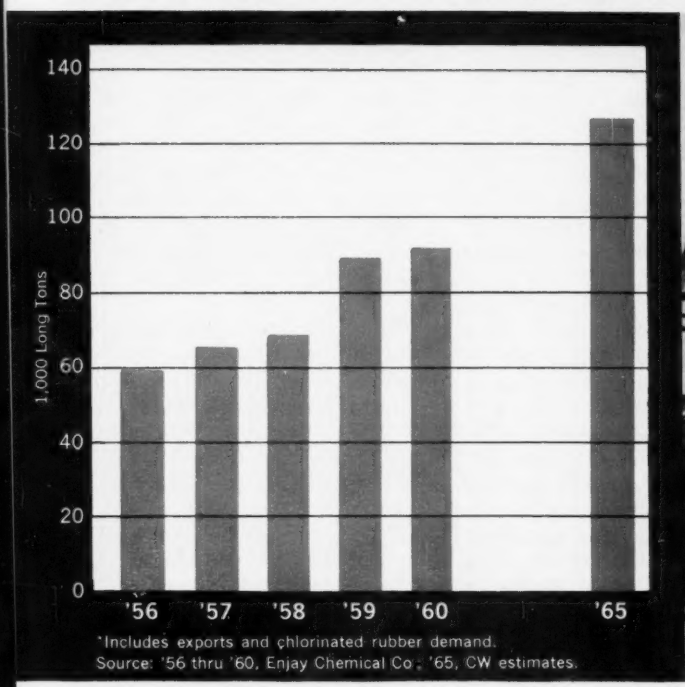
After Several Years of Little Activity, Butyl Rubber Demand Starts Upswing



*Includes exports and chlorinated rubber demand.
Source: '56 thru '60, Enjay Chemical Co.; '65, CW estimates.

Tire Sales Pump Up Butyl Rubber Hopes

Butyl rubber prospects are brightening rapidly as U.S. tire producers continue to jump on the butyl-tired bandwagon. Within the past 12 months three major tire makers (Goodyear, U.S. Rubber and Firestone) have brought out new butyl tires nationally under their own tradenames and are building aggressive marketing campaigns. Now two other companies (General Tire and Pure Oil) are apparently in the final stages of sizable test-marketing programs and may well start full-scale marketing soon.

This push on butyl tires is likely to put butyl rubber on a moderate growth curve in spite of an expected 20,000-tons decline in export and tire tube markets during the next five years. By '65 demand (including exports) will add up to about 125,000 long tons — a 34,400-tons advance over '60's total of 91,200 tons.

Why Butyl Tires? According to the marketers, butyl tires "have uniquely superior properties, compared with the equivalent SBR variety." They are said to give a smoother, more silent ride—no squeal—as well as improved traction, therefore faster starts and stops.

But more important, they have consumer appeal and have been successful in carving themselves a solid share of the tire market despite their 30% premium price. For example, the first butyl tires rolled into the market during '59 when Humble Oil started marketing the Atlas Bucron. During that year butyl tire production hit about 585,000 units. It's predicted now that by the end of '61 output will reach 2 million units and will triple by '63. After '63, forecasters say, demand for butyl tires will stabilize, inching up to about 7 million units in '65. This represents only 10% of the total replacement tire market, but equals 35,000 long tons of rubber.

These forecasts, however, could prove conservative. One of the present major impediments to the butyl tire market growth is the high unit price. Although butyl and SBR rubber move at the same price (23¢/lb.), butyl tire processing problems reportedly run up total manufacturing costs substantially. As these problems are eliminated, however, butyl tire tabs doubtless will slip rapidly, thus calling for a revision of estimates.

Lower prices could even open up the original-equipment market — the most price-affected segment — and dwarf all previous market growth expectations. The new-car manufacturers are reportedly interested in butyl tires and are keeping in close touch with developments.

Modifiers Make Bid: Halogenated butyl rubbers are also expected to take an important part in the butyl invasion into tire markets. Both Goodrich's brominated and Enjay Chemical's chlorinated butyl rubbers will probably come in strong.

Enjay (division of Humble Oil) is especially optimistic over the growth prospects for its chlorobutyl rubber and has a powerful marketing program going. During '60 only a small amount—less than 600 tons—got into tire applications but by '65 demand

for it is expected to jump to about 15,000 tons. Applications such as white side-walls, treads and as inner liners of SBR tubeless tires are the major market target areas. Reason for the optimism: chlorobutyl has the good properties of butyl rubber. Chief among its assets are resistance to weathering and compatibility with other materials. This opens the way to applications where only part of the tire is chlorobutyl-based.

In addition, airplane tire manufacture, which consumes about 7,000 tons of rubber each year, could take a sizable amount of butyl. Work is in progress toward development of a suitable butyl airplane tire, since butyl has resistance to high-temperature, aging and improved traction — now important requirements for jet-plane tires and high-speed landings. Butyl, however, appears less abrasion-resistant in tire applications than are other types of rubber.

Over-all, the market for the tire segment of butyl rubber and the halogenated modifications will likely take at least 47,000 long tons by '65—demand in '60 was only 4,000 tons. But this outlook does not include the prospects of original-equipment passenger tire or aircraft tire markets.

Not So Bright: Meanwhile, the advent of the tubeless tire has cut into demand for butyl rubber in tube production. Last year butyl tube output shrank to 44.7 million units—a decline of 29.7 million from '53's 74.4 million—and concomitantly butyl demand by tube makers went down to about 40,000 tons from 72,000.

Further declines are expected. By '65 butyl demand for this use will probably skid to about 30,000 tons. The factors holding back the complete disappearance of tubes are (1) dealers still insert tubes in tubeless tires—especially after a flat—because of their inability to repair tubeless tires properly; (2) the improbability that tubeless tires will make sizable inroads into the market for truck and bus tires. The big tubes for these tires now take 50% of all the rubber that goes into tubes.

The other dull spot on butyl's horizon is exports. Last year nearly 30,000 tons were shipped. But market observers say the total in '65 will be about 22,000 tons as a result of the rapid buildup of butyl capacity overseas.

Other Uses: The other uses for butyl rubber — now taking on more significance—include a raft of applications — e.g., wire and cable, conveyor belts, steam hose, gaskets, seals.

In '53 these nontransportation applications consumed only about 6000, tons of butyl rubber. But by '60 steadily increasing requirements had swelled the total to almost 17,000 tons. And this advance is picking up momentum. By '65 demand will likely be close to 26,000 tons (7,000 tons of chlorobutyl and 19,000 tons of butyl rubber).

Outlook: While the over-all prospects for butyl rubber include a sharp rise in demand—up 34,400 tons in five years—there is already adequate capacity to take care of '65's estimated domestic and export requirements of 126,000 tons. Humble Oil, currently the only domestic producer (it has plants at Baton Rouge, La., and Baytown, Tex.) has total rated capacity of about 154,000 tons—with Enjay handling the marketing to all users.

Butyl rubber falls into the supply and demand situation prevalent today in the chemical process industries—already enough capacity to take care of future demand. For other firms interested in producing butyl, the decision is knotty, but observers say Cities Service is considering building a 30,000-tons/year unit soon.

Now that butyl rubber has come of age, it seems headed toward a fast growth era. And the key to this growth is aggressive marketing and new product research.

Butyl Rubber End-Uses
(1,000 Long Tons)

	'60	'65
Tires	4.4	47.8
Tubes and bags	41.2	30.0
Wire and cable	4.0	4.7
Other industrial	12.7	21.1
Export	29.6	22
Totals	91.9	125.6

Sources: Enjay Chemical; CW estimates.

U.S. Butyl Rubber Plants, Capacities
(1,000 Long Tons)

Humble Oil	
Baton Rouge, La.	77
Baytown, Tex.	77
Total	154

Bullish in Foam

Plastic foam, both flexible and rigid, is heading for giant growth during the next five years—and it's stirring up broad interest in the chemical industry.

Plastic foam market research is docketed for most chemical companies, consultants have scheduled foam projects and associations are devoting whole conventions to plastic foam. So far, however, there's little agreement among the researchers as to how and where the foam markets will grow fastest.

This week, at the American Institute of Chemical Engineers convention at Lake Placid, Du Pont's John Tallman predicted that plastic foam demand will reach 610 million lbs./-year by '66—more than a 400-million-lbs./year advance over '61's level of about 200 million.

But according to Chemical Marketing and Research Co.'s James Margolis, this estimate is too conservative. Margolis sees demand rising to about 750 million lbs./year by '65. There's one proviso in his estimate: it's based on the assumption that foam demand in the construction industry will swell rapidly.

And Margolis contends that "building inspectors and other people involved in building-code approval will have to change their philosophies." The construction industry has already accepted foams as sandwich panel cores, thermal insulation materials, etc., and as acoustical insulation, and space filler in all types of structures.

The large-volume construction applications that are expected to contribute heavily in the next few years to foam sales growth are paneling, ceiling, roof decking and pipe covering. Rigid polystyrene and urethane foams taking the lion's share of the business.

The optimistic estimates for foam in construction stems not only from evidence of a raft of new applications but also from the over-all growth of construction activity. At last week's National Industrial Conference Board's convention, George C. Smith of MacKay-Shields Associates explained that "the construction market during the remainder of the '60s promises to be the largest, in dollar value, ever enjoyed by any industry anywhere. In terms of today's dollars,

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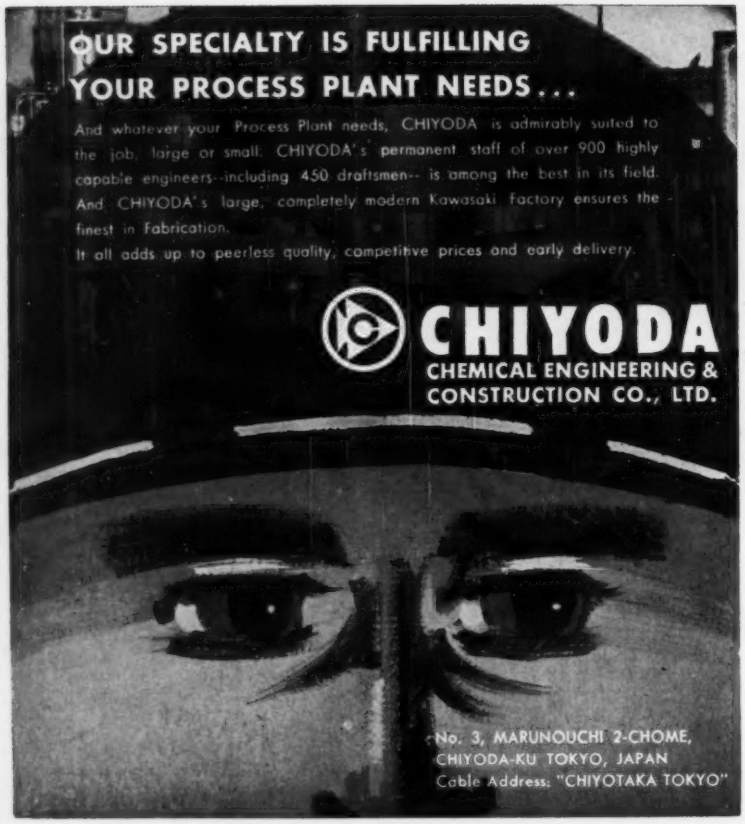
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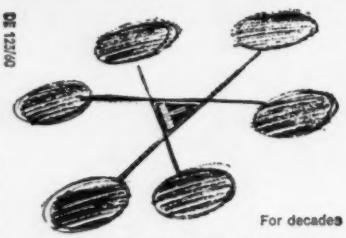

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new construction, plus maintenance and repair, will absorb well over $1 trillion in goods and services during the coming decade."

Firm and Flexible: Market researchers say both flexible and rigid foams are expected to take part in the fast demand pickup during the next five years. But they believe the rigids will grow fastest. Tallman predicts rigid foam demand will reach 345 million lbs. by '66—a 161-million-lbs. gain over '61's total 84 million lbs. Total use of polystyrene and the urethanes will be about 260 million lbs. But the polyolefins, polyepoxies, and the polyvinyl chloride rigids will make substantial gains, too.

Although flexible foam consumption is now ahead of the rigids, flexibles will slip into the No. 2 spot during the next five years. By '66 flexible foam demand will hit about 275 million lbs./year — a 163-million-lbs./-year advance over '61's demand. Urethanes, says Tallman, will account for 235 million lbs. of this total, polyvinyl chloride 35 million lbs. and others the remaining 5 million lbs.

With such active growth expected for the plastics foam market during the short- and long-range future, it is clear why interest is so active among chemical manufacturers.

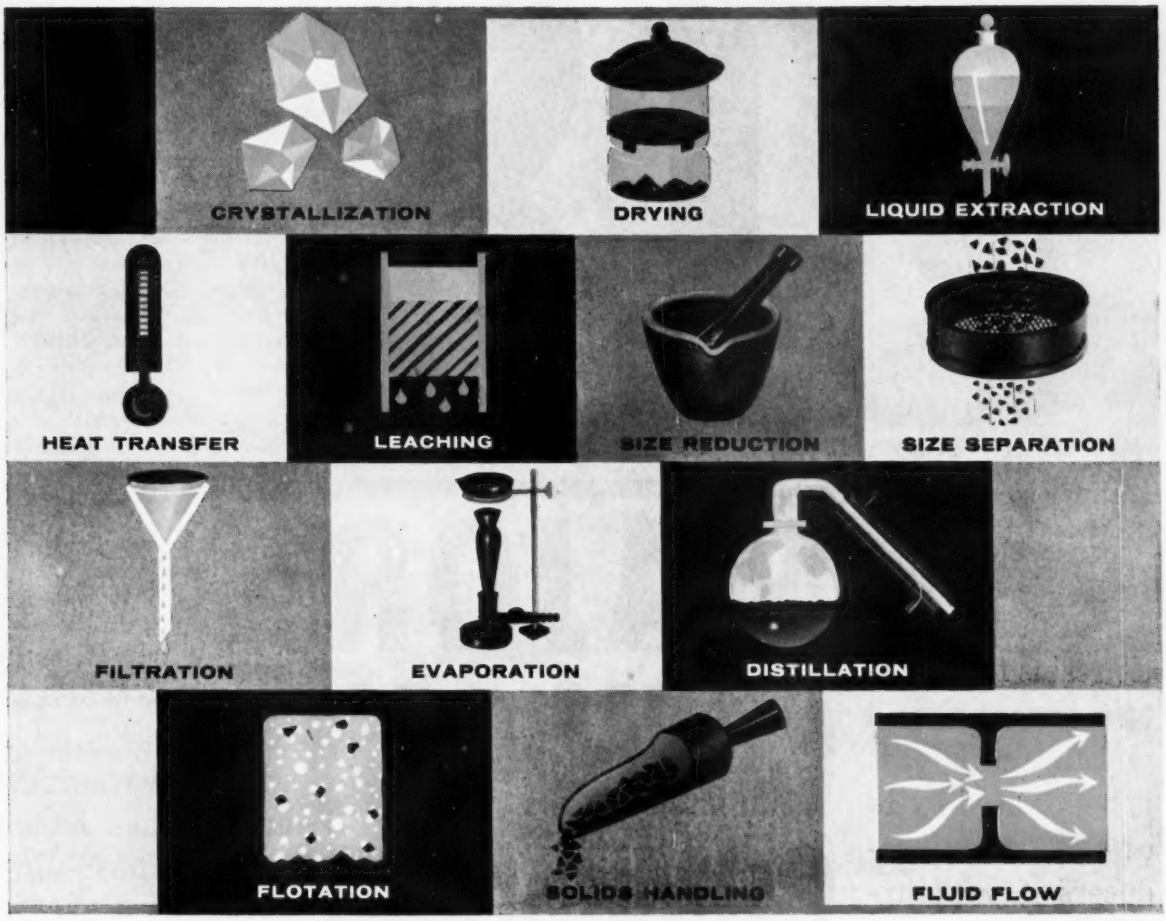
Syndet Sales Up

Soap and synthetic detergent sales rose to a new high in first-half '61, according to reports from 51 manufacturers participating in the quarterly sales census conducted by the Assn. of American Soap & Glycerine Producers, Inc. For the third consecutive year, first-half sales of both soap and synthetic detergents established a new record—were up 2.1% in volume and 2% in value.

Synthetic detergent sales (liquid and solid) totaled 1.7 billion lbs. valued at slightly under $409 million. —up 4% in volume and 3.6% in value from the first six months of '60.

But soap sales alone—503 million lbs. valued at $151 million—were down 20 million lbs. in volume and $3.3 million compared with first-half '60.

Scouring cleanser sales (not included in the above figures) totaled 202.6 million lbs. valued at $27.6 million—up 9.2% in volume and 10.9% in value from last year.



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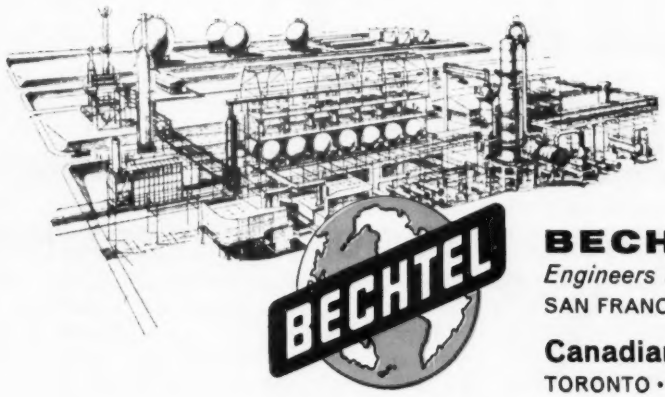

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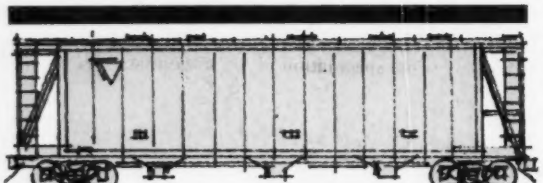

DRY-FLO CHEM® CAR

General American designed its new DRY-FLO CHEM Car to protect plastic resins from contamination and moisture pickup. It is being used by 18 of the major producers of polyethylene, polystyrene and polypropylene. The unique feature which makes this car better than any other for bulk transportation of contamination-sensitive, free-flowing solids is General American's patented nozzle for pneumatic unloading.

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DRY-FLO GENERAL AMERICAN TRADE MARK

Teaming up for Bigger Sales

If plans work out as expected, two recent marketing agreements will give U.S. Borax & Chemical Corp. more profit per sales call, and will put two companies into a potentially big market they couldn't have gone into by themselves. U.S. Borax has agreed to be the agent among its glass and ceramics industries customers for lithium produced by Lithium Corp. of America and rare earths turned out by Vitro Chemical Co.

The arrangement for selling Vitro's rare earths was made a few weeks ago (*CW Market Newsletter, Sept. 2*); the deal with Lithium Corp. for handling that element was made in June '60.

Among chemical company managements faced with the difficulties and importance of today's marketing, such sales arrangements have become popular.

Both Vitro and Lithium Corp., lacking proper sales organizations (they had been selling primarily to the government), had been unable to penetrate the big glass market because of stiff competition from American Potash and Chemical Corp., which itself produces boron, lithium and rare earths. AP&CC had a big marketing advantage: it could combine a carload of boron with lithium and rare-earth specialties, then offer carload prices on the latter, both small-volume products. In addition a part of AP&CC's lithium and rare-earth production is by-product. This conceiveably would make it possible for the company to establish prices simply as a matter of bookkeeping procedure (usually just a bit lower than primary producers' prices based on production costs).

The new sales venture is apparently paying off. Before the U.S. Borax-Lithium Corp. agreement, AP&CC had virtually 100% of the lithium business in the glass industry. Since the agreement, Lithium Corp. has captured about 40% of the market.

On the Lookout: U.S. Borax has long been looking for ways to expand out of boron. The company stepped up its diversification efforts this spring, when Hugo Riemer took over the presidency from James Gerstley, and Gerstley was retained to follow—on a part-time basis—a major interest of his: looking for expansion opportunities.

The company has made good profits for many years primarily because it has one of the richest boron deposits in the world. But efforts to expand boron usage have, to date, largely brought only small gains. The government lost interest in boron missile fuels; consumer products sales (20-Mule-Team) were higher, but few new industrial products, such as boron inorganic polymers, have so far come forth. Thus the company turned to sales arrangements.

Another factor that influenced U.S. Borax in taking on other people's products to sell was that it didn't have enough capital on hand to go into any large ventures on its own. Also, the deals permit it to use an existing sales organization, which has gone about as far as it can go in selling boron to glassmakers, to increase its profit per call with very little extra effort.

U.S. Borax had previously made an effort on its own to get into lithium. The company has a large stockpile of low-grade lithium ore in California as a by-product of its boron mining. In the early '50s it actually did some test marketing of lithium carbonate (using these reserves) to see if it might profitably produce and sell the material. It decided that it couldn't.

At the time Lithium signed the current marketing agreement, there was some speculation in the trade that U.S. Borax might be "just getting the lithium to test and build the market before digging into its own stockpile again." But Lithium's President Harry Feltenstein, Jr., is convinced that U.S. Borax' ore-processing costs would be too high.

Lingering Doubts: Some in the U.S. Borax organization express certain misgivings, feel that it may be more important for a salesman to know well the product he is selling than to know well the consuming industry. This may not apply, however, in glass, which is a traditionally secretive business where gaining a customer's confidence is all important. Without it,

Vitro's Hall: Moving into a new market via a 'borrowed' sales force.

Lithium's Feltenstein: Carving a 40% position in the glass industry.

U.S. Borax's Riemer: Making more profit per call with his salesmen.

the customer may not disclose all his technical requirements to the salesman. This makes it difficult to do an intelligent selling job.

The supplying companies have set up one-week-long briefings for U.S. Borax's glass industry salesmen. In addition, they have agreed to provide technical service on the products.

The commission paid to Borax is estimated to be in the neighborhood of 15%, but Vitro, for one, feels the arrangement will increase rare-earth sales enough to make it a profitable line (it hasn't been so far) by '62. The company feels that this is a necessary step in getting the 30% annual growth it considers minimal to keeping it in the business. Vitro President W. B. Hall hopes that U.S. Borax will double or triple its rare-earth sales to the glass industry within the year, adding a significant 500,000 to 1 million lbs./year to over-all sales.

Among the rare-earth products that Vitro Corp. sells to the glass and ceramics industries are cerium hydrate, cerium oxide, cerium-free rare-earth carbonate, lanthanum oxide, neodymium oxide, samarium oxide, scandium oxide, and cerium oxide polishing compounds. Their uses in the industry range from coloring glass to imparting desired dielectric properties, infrared absorption, and luminescence. In addition, some are used in polishing plate, mirror and precision glass.

Lithium Corp. is restricting its participation in such sales agreements generally to the hard-to-sell glass industry. But for Vitro, it is becoming something of a way of life. It has been selling its thorium magnesium alloy to magnesium producers, including Dow Chemical, Hills-McKanna, Brooks & Perkins. These firms downgrade it by adding more magnesium and then sell it to the aircraft industry. Vitro is now looking at distributors to cover the hundreds of small firms in the opthalmic field (Vitro services big customers itself).

In the meantime, all three parties—U.S. Borax, Vitro, Lithium Corp.—are happy with the marketing arrangements, and consider it an ideal solution to a frustrating problem: What do you do when you have a good market, but not enough products? And what do you do when you have the products, but don't have sales manpower enough to reach the customers?

New Hybrid Bids for Sales

Chemical process industries formaldehyde users are getting the hard sell nowadays from producers of that chemical's newest hybrid—stabilized formaldehyde—which could augur a sharp turn away from the time-tested inhibited varieties.

In the last year and a half Celanese Corp. (New York) has revamped its entire formaldehyde line, now sells only stabilized grades. And both Borden Chemical Co. (New York) and Heyden Newport (New York) have followed closely on Celanese's trail, debuting their entries in late '60 and early '61. Both, however, are continuing production of inhibited formaldehydes.

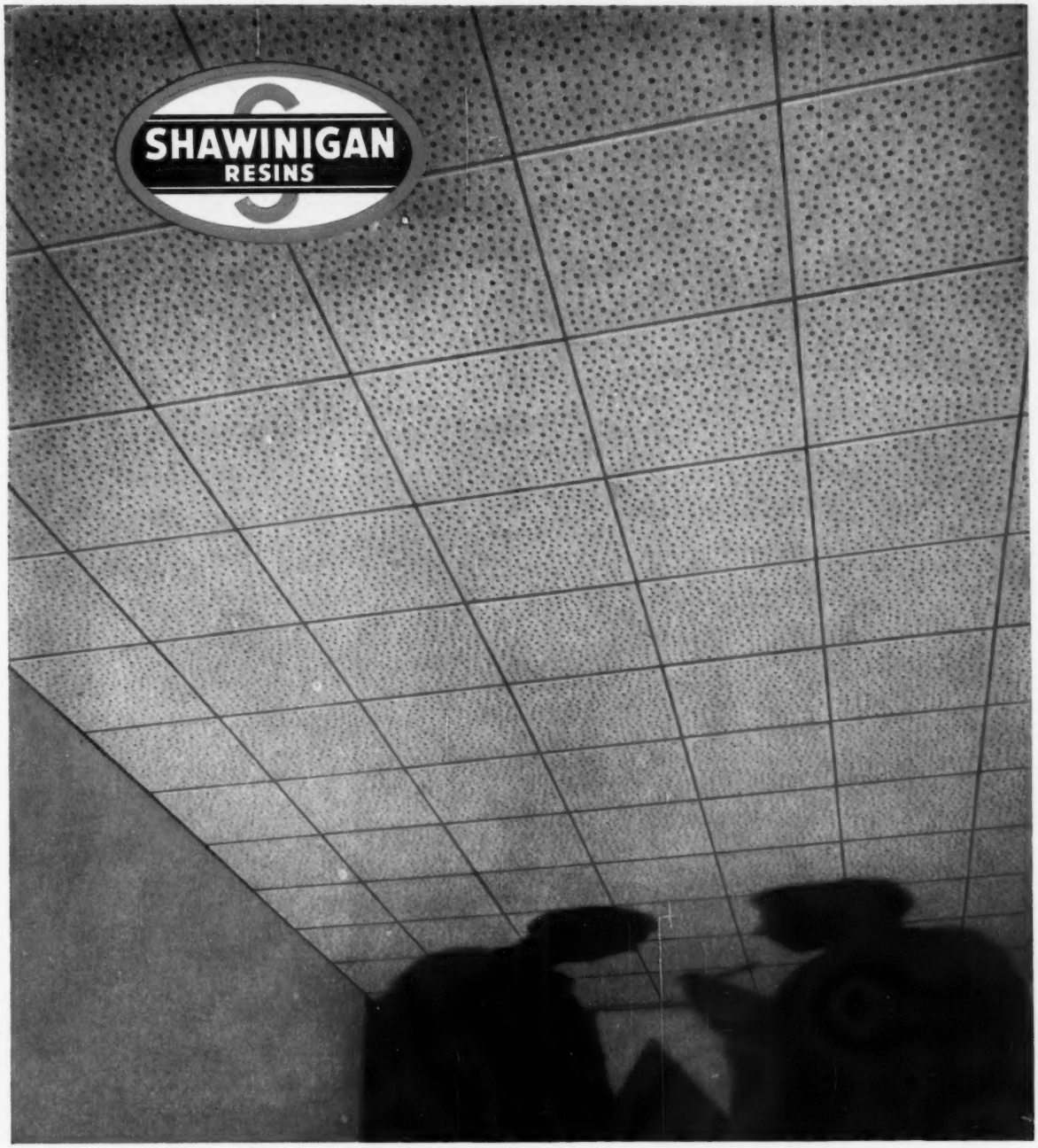
None of this trio—nor any of the other firms that have since joined the race for stabilized-grade formaldehyde markets—will release information as to what the stabilization process involves. But all emphasize two important advantages that formaldehyde gains from it: (1) a reduction in storage temperatures (20 F less for 44% stabilized); (2) savings of up to 0.03¢/lb. Underscoring the latter, Heyden Newport, in a recent advertisement, quotes a $90 cost slash for 30,000-lb. shipments when the buyer switches from the 37% formaldehyde solution U.S.P. (with 6-7.5% methanol) to Heyden's stabilized 37% methanol-free formaldehyde.

Possible Problems? But it may be just these points, according to Borden Chemical's sales manager, Eric Mackey, that could lead to an over-enthusiastic sales program for stabilized brands—and possible trouble for the users. Mackey notes that the changeover from inhibited to stabilized grade is essentially "a change in chemical recipe." To the user, this can mean another ingredient to deal with in his chemical reactions—and one that should be checked out in advance for possible adverse effects.

Mackey cites one example of what can happen with anyone's product: occasional foaming of the stabilized formaldehyde cropped up in the formation of urea resins. This would be practically nonexistent with the inhibited varieties. Moreover, some formaldehyde consumers, attracted by stabilized formaldehyde's advantages, may find that it simply won't fit into processes they developed around the inhibited grades.

For these reasons, Mackey emphasizes, any customer that contemplates the switch to the stabilized types should make sure, possibly through test samples, of any changes that could cause unwanted side effects to reactions. To help delineate the differences between inhibited and stabilized materials, Borden will soon distribute a four-page technical bulletin that reviews all types of formaldehyde.

Buyers' Education: At the same time, Borden's competitors also recognize the need to thoroughly educate their customers. Heyden New-



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port sends out a brochure before making any attempts to sell stabilized material. Also, samples are supplied to prospective buyers for evaluation. Celanese, before publicly disclosing its total move into stabilized-grade production, went through a long test period with a number of selected customers to work out any "bugs" in its product.

Meanwhile, Borden and Heyden Newport are keeping plenty of inhibited formaldehyde on hand. They expect to produce, for the time being at least, only enough stabilized material to satisfy present customer needs.

But sales seem to be growing. Borden already has committed about 5% of its total formaldehyde production, now rated at 300 million lbs./year, to the stabilized material, and reports that most customers are more than satisfied with the new brand.

Justifying Celanese's all-stabilized line, one company executive noted that it would be "silly to take halfway measures" with a successful product. Borden and Heyden Newport, however, are going slow.

Dow Offers Réalités

To reach top-management readers, Dow Chemical Co. has decided it needs direct mail, but that ordinary direct mail won't do.

The company found that although its conventional direct-mail material was reaching technologists and purchasing agents among its important paintmaking customers, it was frequently overlooked by top management. Dow's solution: it sent to 1,000 executives gift subscriptions to the French magazine, *Réalités*, each copy containing a four-page Dow insert ad heralding paint raw materials. Also, a French-language version was sent out to about 100 French and Belgian customers.

In one ad, Dow says, "The unique function of the chemical industry, and of our company, is this: we are an unparalleled source of experience and talent trained to work in opportunity areas where solutions can be met through the design and chemical rearrangement of matter." This fairly well sets the tone of the campaign.

Each issue will have a four-page insert ad telling of Dow's activities in the paint field.

Tracers

TO THE CHEMICAL PROCESS INDUSTRIES

POSITIONS VACANT

Wanted—The services of a qualified Chemist or C/E age 28 to 40, healthy, willing to work and take responsibility, working in Lab, Plant, Road and generally Assistant go the Manager. Party must have accredited college degree as well as experience in the field of Water Treatments for boilers and cooling systems. Write or contact, state salary expected, to National Chemical Sales Co., Inc.—414 Sixth Street, N.W., Atlanta, Georgia.

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Chief Chemist, R. & D., Paints. Medium size Eastern manufacturer making well-established line of chemical-resistant coatings has challenging opportunity for experienced chemist in development and formulation of coatings based on chlorinated rubber, vinyls, alkyds, epoxies, acrylics, coal tar pitch, asphalt. Duties also include troubleshooting requiring broad paint experience. Present chief chemist approaching retirement. Remuneration commensurate with ability. Replies will be kept strictly confidential. Send complete resume preferably accompanied by photo, and indicate salary requirements. Address. P-7524, Chemical Week.

Chemistry Graduate, or Chem. Eng., 21-29, draft exempt, for responsible position as national chem. storage sls. mgr. of growing Philadelphia bulk-storage firm. Attractive benefits. Send resume, salary requirements P-7531, Chemical Week.

V-P Marketing: Well established expanding chemical manufacturer seeks man to be responsible for all marketing. Must have 10 years in sales and sales management plus knowledge of industry, sales strategies, and channels. Minimum requirement college degree, preferably chemical area. Will have 50-100 sales force to manage. Must be profit conscious, good communications organizer, a driver, sophisticated, sense of humor, potential for top management. Report to President. Salary minimum $20,000 plus bonus up to 50% after first year. Stock options. Profit sharing. Location midwest. Moderate travel. Send full personal history and salary requirement to P-7544, Chemical Week.

Technical-Administrative Assistant to Director of Technical Development. Must be alert, flexible and able to function with minimum instruction. 5—15 years experience desirable in instrument and/or broad diversified fields. Chemical Engineering or Mechanical Engineering background, or possibly degree in physics or physical chemistry. Write in confidence to P-7571, Chemical Week.

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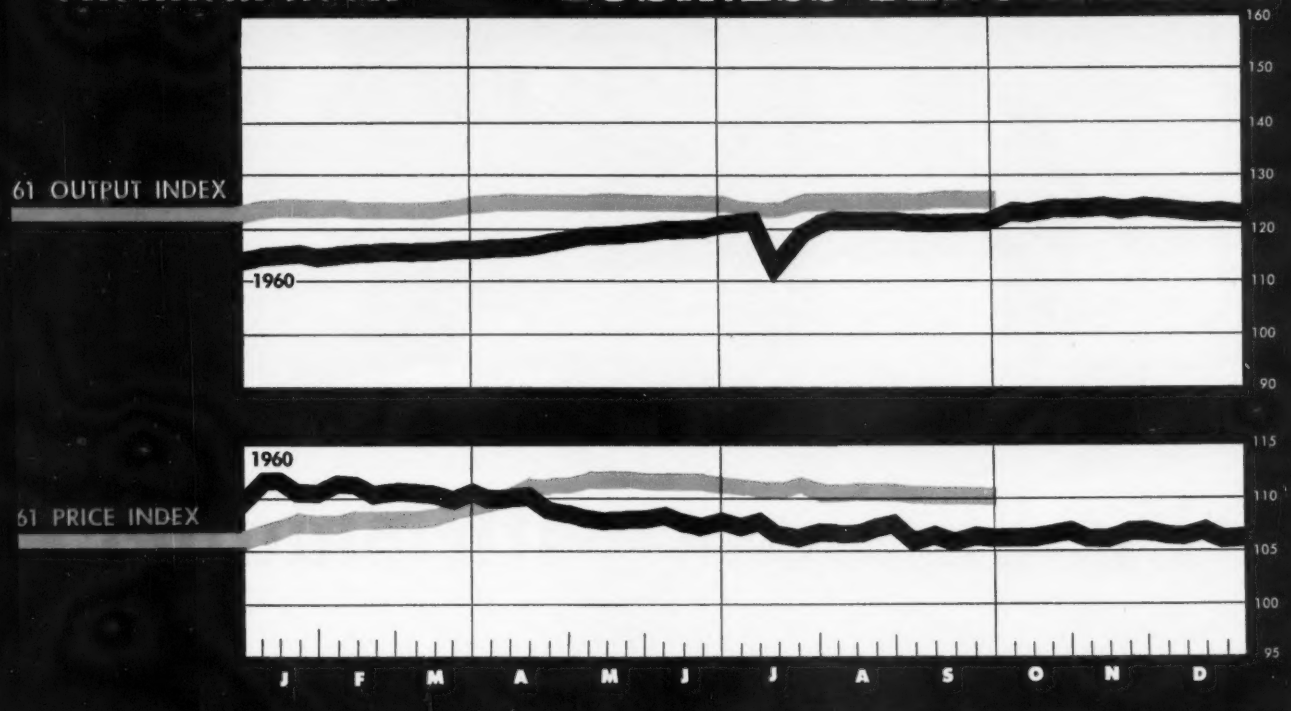
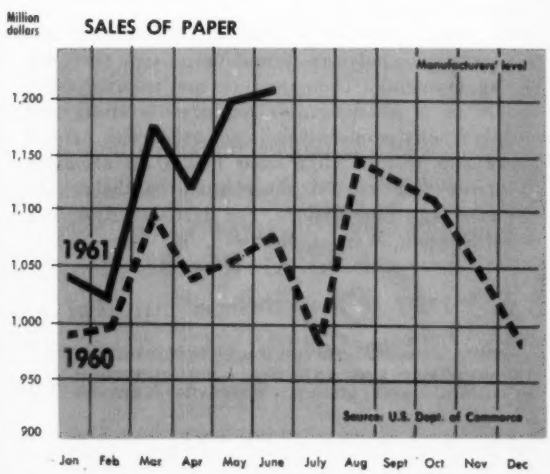


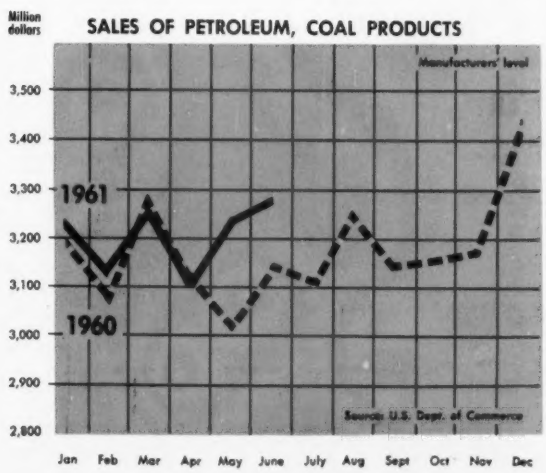
SEPTEMBER 30, 1961

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1957=100)	125.8	126.0	122.2
Chemical Week wholesale price index (1947=100)	110.5	110.5	106.4
Stock price index (12 firms, Standard & Poor's)	54.80	55.55	46.23
Steel ingot output (thousand tons)	2,032	2,032	1,510
Electric power (million kilowatt-hours)	15,869	15,838	14,298
Crude oil and condensate (daily av., thousand bbls.)	7,111	7,162	6,847

PRODUCTION INDICATORS (1957=100, without seasonal adjustment)	Latest Month	Preceding Month	Year Ago
All manufacturing	110	105	106
Nondurable goods manufacturing	121	112	117
Durable goods manufacturing	102	100	98
Chemicals and allied products	124	131	118
Industrial chemicals	137	136	130
Petroleum and coal products	116	113	115

CHEMICAL CUSTOMERS CLOSE-UP



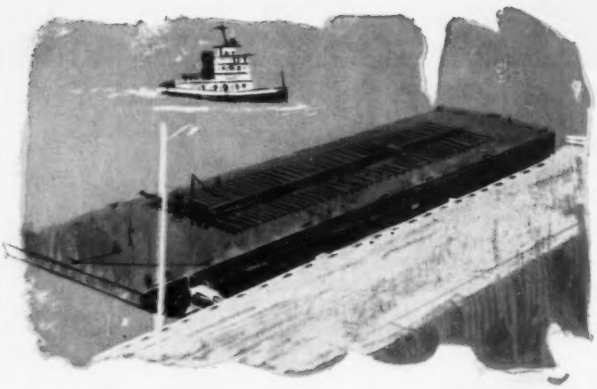


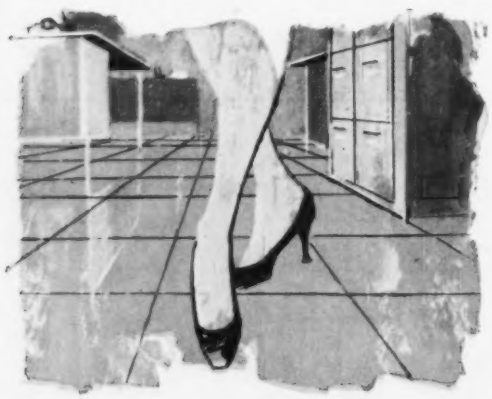
4
WAYS YOUR
Profits Grow with Stauffer

Spent Acid Dividends?

Good investment for your plant can be to turn over your spent acid wastes to Stauffer's Consolidated Chemical Industries Division for reclamation. No tax on your profits to build costly disposal units, and you get back extra dividends of pure, water-white sulfuric acid ready for use.

It's service you can bank on, too, because we operate tank cars, barges and trucks around the clock to keep spec-meeting supplies of sulfuric flowing to our customers. Making spent acid work again is another way your profits grow with Stauffer chemicals. Contact Consolidated Chemical Industries Division, 6910 Fannin Street, Houston 25, Texas, or Stauffer's Industrial Chemicals Division, 380 Madison Ave., New York 17, N. Y.





Light-Footed?

Maybe . . . but a petite woman's spike heel lands with a pressure of 1100 pounds per square inch . . . murder on floors and finishes.

Modern floor polishes—polystyrene, polyacrylate and styrene acrylic co-polymer formulations—can take this punishing pounding. Their makers use tributoxyethyl phosphate as a plasticizer. It improves levelling and spread—is readily emulsified and compatible with natural polymers and resins. TBEP also makes an excellent co-plasticizer with tributyl phosphate or phthalate for certain floor wax formulations. For data, ask Anderson Chemical Division, Weston, Michigan.

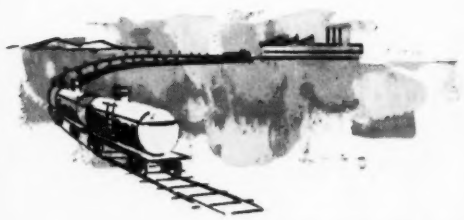
Stauffer CHEMICALS

AGRICULTURAL CHEMICALS DIVISION • ANDERSON CHEMICAL DIVISION • CONSOLIDATED CHEMICAL INDUSTRIES DIVISION
INDUSTRIAL CHEMICALS DIVISION • A. R. MAAS CHEMICAL COMPANY DIVISION • METALS DIVISION • MOLDED PRODUCTS
DIVISION • VICTOR CHEMICAL WORKS DIVISION • WEST END CHEMICAL COMPANY DIVISION • INTERNATIONAL DIVISION

"Step on it"—Chemically

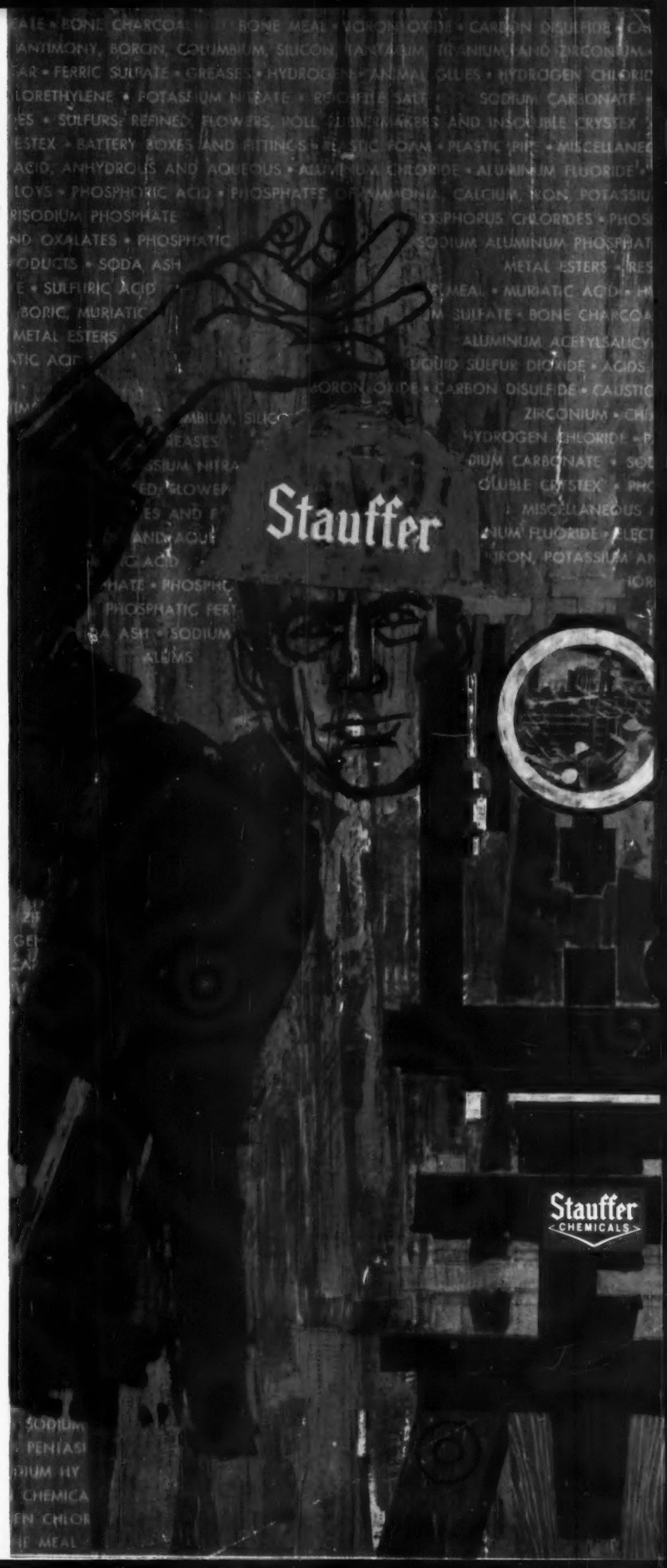
More reactive than most phosphorus compounds, phosphorus oxychloride is an intermediate that makes many chemical reactions "get up and go." For example, many major producers of gasoline additives specify phosphorus chlorides for their run . . . and they know that for quality "It pays to see Victor"—one of the primary producers of phosphorus compounds. Write for Technical Service Bulletin No. V2-60. Victor Chemical Works Division, 155 North Wacker Drive, Chicago 6, Illinois.

Chemicals

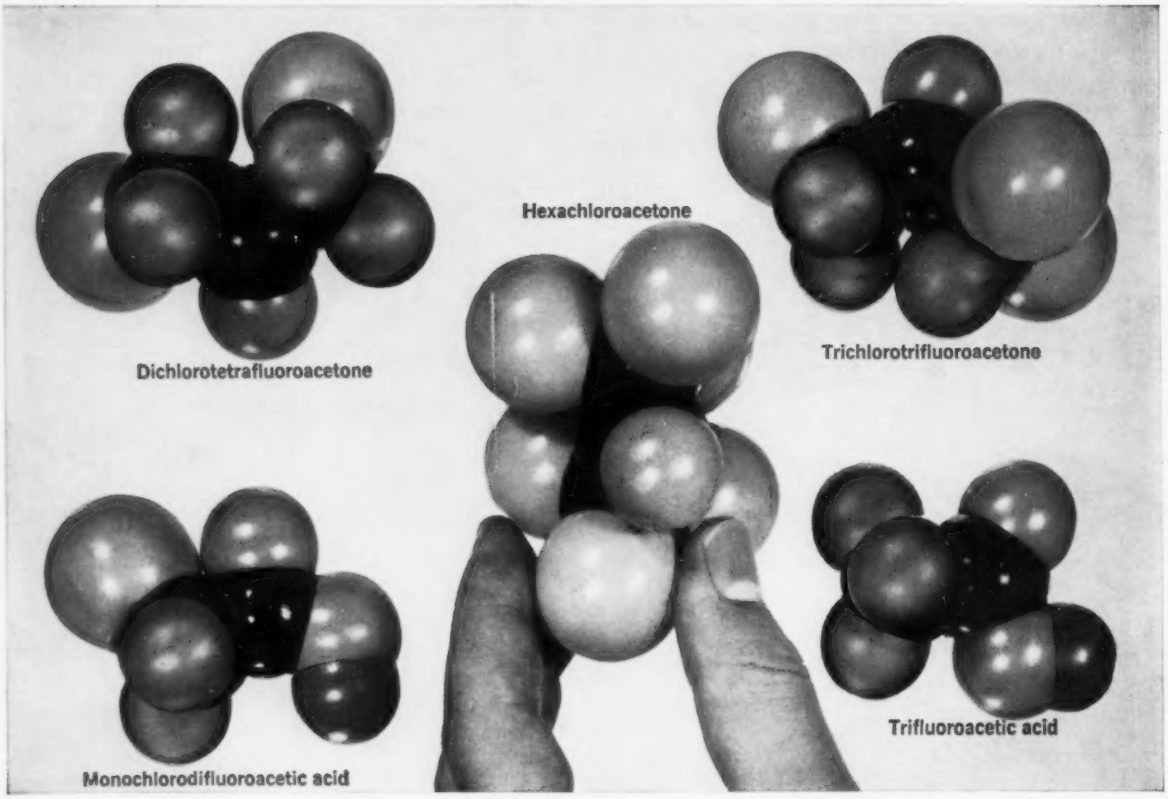


There's more than rockets at Redstone!

After December 15th, Stauffer will operate two government-owned plants at the Huntsville, Alabama, missile center, producing chlorine and caustic soda. Even before our output is in orbit, Stauffer will have a fully staffed sales office in Huntsville to service Southern paper, textile, petroleum and other chemical-using industries. The Huntsville plants plus other Stauffer chlorine and caustic soda production facilities at Niagara Falls and Henderson, Nevada, will provide multiple supply sources. Strategically located plants and service facilities are other good reasons why your profits grow with Stauffer chemicals. Let's discuss your needs. Industrial Chemicals Division, Stauffer Chemical Company, 380 Madison Ave., New York 17, N. Y.



5 *Highly Reactive New* HALOGENATED ORGANICS!



Now, from General Chemical: three new ketones, two new acids!

These functional halogenated organics are still in the development stage, but show considerable commercial promise:

1. **Dichlorotetrafluoroacetone**
2. **Trichlorotrifluoroacetone**
3. **Monochlorodifluoroacetic acid**
4. **Trifluoroacetic acid**
5. **Hexachloroacetone**

We predicted many uses for these unusually reactive halogenated organics when we first offered them in experimental quantities. The response confirmed our judgment that they have far-reaching applications as complexing agents, solvents, catalysts for condensations, esterifications, polymerizations, Friedel-Crafts reactions and the like, and as raw materials for fluoro-organic synthesis. These materials, in their specific classes, show unique properties, and in many reactions yield potentially valuable products normally not predicted for this series. Examples of these reactions can be found by referring to the papers included in our bibliographies.

It may be that you have in mind some halogenated organic even a step beyond these. Let us know . . . and we may be able to help you. Technical reports, bibliographies and data sheets are ready now on these five interesting chemicals. Just write us. Limited developmental quantities are available.

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.